

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

- April 18 to May 2 Seaplane Competition at Monaco
- April 21 to May 1 Pacific Aeronautical Exhibition at San Francisco.
- April 28 ... Lecture on "Aerial Transport from the Business Point of View." By General Sir Sefton Brancker, Royal Society of Arts, 8 p.m. Arts, John Street, Adelphi, at 4.30 p.m.
- May 1 ... Opening date for *Daily Express* £10,000 prize competition for flight to India and back.
- May 20 to 30 Pan-American Aeronautic Congress at Atlantic City.
- May 22 and 23 Aviation Competition at Juvisy in connection with Fêtes de Paris
- May 23 to 30 Seaplane Contests at Barcelona.
- June 22 ... Wilbur Wright Memorial Lecture, H.R.H. Prince Albert presiding, at 8 p.m., at Central Hall, Westminster. Commander J. C. Hunsaker will read a paper on "Naval Architecture in Aeronautics."
- July 9 to 20 S.B.A.C. International Aero Exhibition at Olympia
- July (mid.) Seaplane Contests at Antwerp
- July 24 ... Aerial Derby.
- Aug. 3 ... Air Ministry Competition (Large and Small Type Aeroplanes)
- Aug. (end of) Schneider International Race, Venice.
- Sept. 1 ... Air Ministry Competition (Seaplanes)
- Sept. ... International aviation week (with competitions) at Brescia, Italy
- Sept. 27 to Oct. 3 Gordon-Bennett Aviation Cup, France
- Oct. 22 ... Gordon-Bennett Balloon Race, Indianapolis, U.S.A.

EDITORIAL COMMENT



WE are by no means satisfied that all is going well with British aerial enterprise, or that the measure of encouragement held out by the State is what it might and should be. At the same time, we do not think any good end is to be gained by the quoting of single-day statistics tending to show that we are hopelessly behind and that others have a monopoly of all that is being done. We are sorry, therefore, to note that so whole-hearted a supporter of aerial enterprise as Mr. Holt Thomas has allowed himself to fall into this error. In a recent issue of the *Daily Mail* he wrote that the Air Ministry notices of the 14th inst. contained the names of two French and only one British machine as having left Croydon for Paris on that day. This was promptly challenged by Messrs. Handley Page, who suggested next day that it is not fair to base a judgment on one day's departures and that it would be better to take the figures of a whole week. They point out that if this were done it would show a considerable preponderance of British machines. It is also pointed out that on a recent day five British and one French commercial aeroplanes, operating in conjunction with the Handley Page Transport Co., left London for the Continent. It is quite true that statistics can be made to prove anything, and here we have an example of the way

figures convey a quite misleading impression, however innocently. It does not matter for the purposes of the argument whether the British industry is going ahead satisfactorily or not. That is another question which does not fall to be discussed at the moment. In the one case, the figures given by Mr. Holt Thomas would convey the impression that the French are twice as active as ourselves in the matter of aerial transport. That impression stands, until we read the figures submitted by Messrs. Handley Page, when not only is it reversed but we are left to think that the ratio of activity is as five to one in our favour. Neither is right, obviously, and we should not have referred to these letters at all except to show how people may be unintentionally and innocently misled by the quoting of detached or incomplete figures.

The Air Ministry Prizes

It is now some eight or nine months since the Air Ministry published the first draft rules for the governance of its competitions to be held next autumn. These draft rules have been considerably modified in the meantime, and have now been issued in what appears to be their final form. The competitions have as their object the promotion of increased safety, comfort and economy in aerial travel, while the prizes to be competed for are as follows:—

(a) Prizes open to British subjects for aeroplanes including engines designed and manufactured in the British Empire:—
Small type.—1st, £10,000; 2nd, £4,000; 3rd, £2,000. Large type.—1st, £20,000; 2nd, £8,000; 3rd, £4,000.

(b) Prizes open to British subjects for seaplanes (amphibians) including engines designed and manufactured in the British Empire:—1st, £10,000; 2nd, £4,000; 3rd, £2,000.

The Government reserve the right to vary the proportion of totals under (a) and (b) between the various prizes if the merits of the machines warrant it or to withhold any or all of the prizes if, in the opinion of the judges' committee, no real advance on existing designs is shown. The Government will, if the entrant agrees, buy the machine of each type winning the first prize, the designs to remain the property of the manufacturers. The maximum prices payable under this head will be:—

	£
Aeroplane, small type	4,000
Aeroplane, large type	10,000
Seaplane	8,000

Two new tests have been introduced. One, for multi-engined machines, consists in getting off and landing with one engine cut out. The other is a test of reliability and economy which is an expansion of the original proposal to carry out a test of reliability alone. The definition of the full load under which this test is to be carried out is: "petrol and oil sufficient to fly 450 miles at 3,000 ft. at a speed of not less than 80 m.p.h., and in addition the declared passenger load (including pilot and crew, if any), the standard weight of each person to be taken at 200 lbs."

The Regulations as they have been finally agreed are an advance on the originals. Under the latter it was possible for machines to obtain full marks for one quality by sacrificing something in other directions. For example, a machine might achieve a magnificent record for climbing, but be hopeless from the point of view of economy. Speed in another might be obtained at the sacrifice of some degree of reliability. The best prizes, awarded under an arbitrary system of marking, might, as a consequence, go to machines which, however efficient in one direction, might be completely useless from the point of view of successful commercial operation. As they are now drafted,

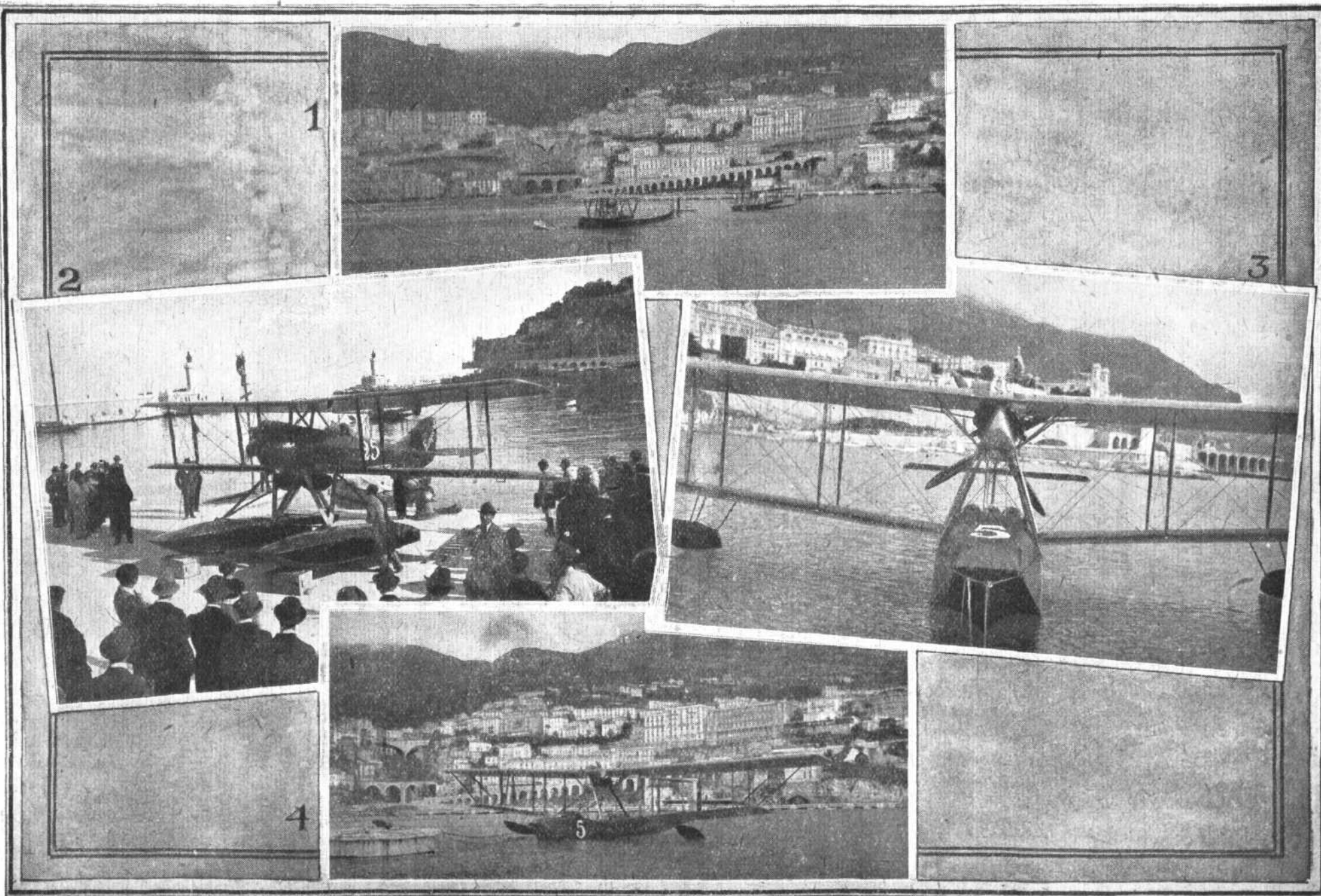
the Regulations seem to have got over most of these objections and aim rather at all-round performance. This is very much to the good and we look forward to the competitions, which are to be held in August and September next, being productive of a great deal of good to the design and construction of commercial aeroplanes and seaplanes.

"A Year's Commercial Flying"

In two very interesting articles bearing this title Mr. Holt Thomas has told, in *The Times*, the story of a year of the London-Paris air service. We need not follow him through the whole of the history, which is known quite well to readers of *FLIGHT*, but certain of his conclusions are of more than passing interest. He says that after 12 months of such experimental flying as he has described, it would be foolish to write anything specific or detailed about finance. "I am aware," he says, "that when one says this there are people who are inclined to think one is begging the question and there is some skeleton in the cupboard which will prevent commercial flying becoming a success. Yet such is far from being the case. I think that, after actually starting the London-Paris service and watching its development stage by stage . . . I am within the mark in saying that the year has proved that if postal departments will only take the step—as they have already done in America—of deliberately putting mail-matter into the air, it should be perfectly feasible for European commercial flying to be established on a sound basis financially. A year ago this was a pious hope. To-day, with guaranteed mail loads, we know it can be made a reality. Without such regularly-provided loads and while the community as a whole is being educated to make use of this new mode of transport the outlook financially cannot be anything but doubtful."

These are points of view which have been set forth more than once in the Editorial columns of this journal, but they cannot be too often repeated at a time when the postal departments do not seem inclined, except in a very half-hearted way, to extend the helping hand to aerial transport. Why their attitude is what it is we do not profess to understand. It is not as though the ideas underlying such pronouncements as that we have quoted above required large sums of money out of the Exchequer to give them effect. On the contrary, the industry is asking for nothing except in a perfectly legitimate commercial way. Those who are behind say that, given guaranteed mail loads, they are able to carry those loads at a cost which is no higher than that of transport by other methods, especially when the saving of time effected by aerial transport is taken into consideration. Therefore, the proposition is purely a business one, and it might be thought that if the Government were serious in their expressed desire to help aviation it would be accepted as such.

It cannot be that the authorities are unable to regard aerial transit for mails as unsafe. The showing of the past twelve months of aerial transport between London and Paris negatives that idea completely. Not a single letter has been lost in transit. Even delays have been very few and seldom have even these been serious. What, then, is it that makes the Post Office so slow to examine the possibilities with anything like sympathy? We confess we are at a loss to imagine, except that we know how slow such departments are to move and how they love to remain in the age-old ruts in which they are wont to rock



THE MONACO SEAPLANE MEETING: (1) At Monaco: Two French flying boats. That nearest the camera is the Tellier-Hispano of the Toulon squadron, which was to make the Monaco-Tunis-Monaco *hors de concours*. The other machine is the Sunbeam-engined Tellier-Nieuport flying boat which M. Sadi Lecointe entered to fly in the Monaco-Tunis-Monaco flight. (2) The Nieuport seaplane on the North quay, having its engines tested. (3) The Sunbeam engine fitted in the Tellier-Nieuport. (4) A view of the Sunbeam-engined Tellier-Nieuport flying boat at her moorings

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their wooden horses. Not only is there little apparent sympathy, but there would even seem to be hostility, as we may see presently.

The Post Office and Air Mails

The Postmaster-General has invited tenders for the carriage of mails by air from this country to Holland. The tenders are to be for a daily service, Sundays excepted, from London to Holland. It is set forth as being desirable that any company tendering should be in a position to arrange for joint working with the company holding the contract with the Dutch Post Office for the service from Holland to London. The company tendering, however, will be solely responsible for the outward service, whether performed by its own aeroplanes or not, which must be carried out notwithstanding any breakdown or the discontinuance of the Dutch service in the reverse direction. Clause 9 of the document inviting tenders lays down a condition which seems impossible and which one would almost think had been inserted in order to discourage firms from tendering. It reads: "No payment will be due to the contractor in cases in which the service is not completed, or in which mails sent by air do not arrive at the terminal aerodrome by 8 p.m. If on any occasion it is impossible to complete the flight, the contractor must arrange at his own expense for the onward transmission of the mails to their destination by the quickest means available."

Strictly interpreted, this means that where the contractor cannot, by reason of fog or stress of weather, carry out his undertaking to convey the mails by aeroplane he is left with the responsibility of arranging on the spur of the moment for special trains and steamers—assuming these can run in the conditions—at his own expense and if he does not succeed in delivering his mails within five hours at The Hague he will, under the conditions of his contract, receive no payment. Is it likely that any firm, which is in the business for other than philanthropic or patriotic reasons, will tender under such conditions? Or, if it should tender, will the price submitted not be too high to justify itself on any ground but the provision of an insurance against the inevitable day when there will be a failure to arrive at the terminal aerodrome to time? Let it be clear that we are not asking that air transport should be favoured against older methods of transport. But it must be remembered that it is no infrequent occurrence for the seaborne mails to Holland to be very late indeed when there is heavy fog in the Channel and the North Sea. In these cases the contractor is certainly not asked to provide an alternative form of transport at his own cost and expense.

Clause 11 is open to serious objection, since it seems to mean that the Post Office is generously offering the facilities of aerial mail transport to the public at the expense of the contractor. The tendering firm has to state what price they require per packet or per lb. carried, but there is no mention of any guaranteed load. Obviously, this means that the service has to be maintained by the contractor, even if the Post Office is able to find no more than 7 lbs. weight of mail on any particular day, so that it is quite possible that on occasion a flight from Croydon

to The Hague might have to be carried out for the gross payment by the Post Office for a couple of pounds! Nor can the unfortunate contractor always cover himself by the carriage of passengers or goods, since it is laid down as a condition that this will only be permitted when it does not interfere with the safety of the mails or the due performance of the mail service. How is the contractor to know what weight of mails he will be required to carry tomorrow, so that he may arrange, in the event of a light mail load, to make good by passenger or parcel bookings what the Post Office cannot find? It is obviously impossible, as anyone but a Government official would realise if he gave the smallest thought to the matter.

If this is the sort of encouragement the Post Office is prepared to give, then all we have to say is that the industry would be better without it. We should at any rate know where we stand, and should not be buoyed up by false hopes. It is very much to be hoped that no firm identified with aerial transport will tender until these two conditions at least have been modified and the Post Office consents to a contract which is not of the "heads I win, tails you lose" description.

The R.A.F. Memorial Fund

The Executive Committee of the Royal Air Force Memorial Fund are making a strong appeal for subscriptions to the most worthy objects for which the fund exists—an appeal which we sincerely trust will result in a very substantial addition to its balance. It is intended to apply the fund to: The erection of a commemorative monument to the fame of the officers and men of the R.N.A.S., the R.F.C., the Australian Flying Corps and the R.A.F., including the officers and men who joined the Force from the Overseas Dominions; the establishment of places of residential education (like the Trafalgar Homes) for the children of airmen; the provision of bursaries available at approved schools for the children of officers; and generally the provision of such treatment and the rendering of such assistance as means may permit, either directly or in cooperation with other organisations, to officers and men and their dependents who may be disabled, sick, or otherwise infirm. All officers and men of the Flying Services, whether from the Dominions or from the United Kingdom, will be equally eligible for these benefits.

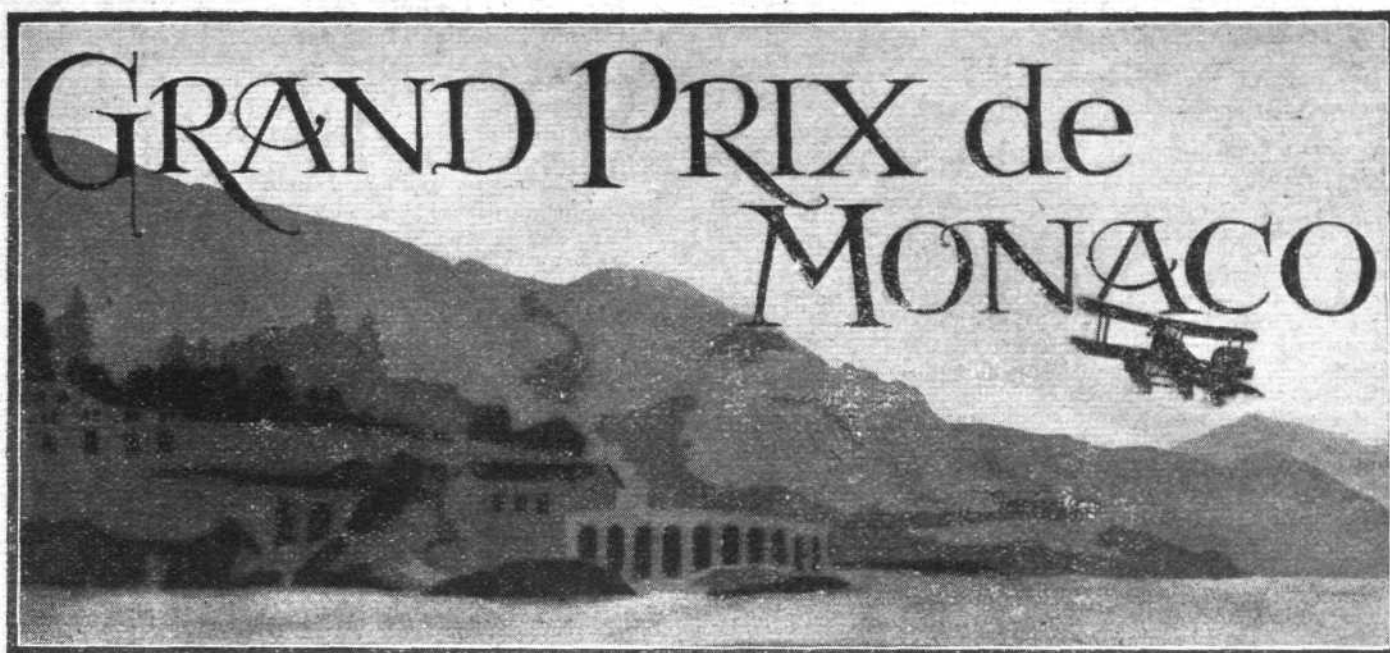
Could there be any worthier objects than these? The nation and the Empire cannot forget the wonderful self-sacrifice manifested by the officers and men of the Flying Services during the War, or the measure in which their services helped the cause of the Allies and assisted to ultimate victory. Let it show its appreciation of those services by a ready and generous response to the moving appeal made by Prince Albert and his colleagues in the administration of the fund. There are no worthier objects to which money can be devoted than those to which the fund aspires—to educate the children of those who gave their lives for the Empire; to heal the sick; and to comfort the disabled of the Great War in the air. Those who would wish to further the success of so splendid a purpose should put themselves into communication with the secretary of the fund at 25, Victoria Street, Westminster.

Aerial Mails in U.S.

AERIAL mails in the United States appear to be assured, as it is stated that President Wilson has signed the Post Office Bill making appropriations for a trans-Continent aerial mail route, New York-Chicago-San Francisco.

Aviation in Scandinavia

REPRESENTATIVES of the four Scandinavian countries have drafted laws to cover aviation in their respective countries, and they are to be submitted shortly to the four Parliaments.



BY THE TECHNICAL EDITOR

Monaco, Monday, April 19.
YESTERDAY the weather was very far from being what one expects in these latitudes. From the early morning the rain came down in torrents, and it was quite evident that there was no hope of any competitor arriving by air. The two machines already here—the Spad and the Nieuport—were being finished off, the Nieuport having to make the best of a bad job out in the open, while the Spad was somewhat better off, a covering having been spread over the framework of the hangar. There appears to be very little more to do to these two machines, and if the weather holds—it is today truly Monegasque, with a calm sea and blue sky—it seems probable that the monotony of waiting for the others to turn up may be relieved by some altitude flights by Lecoite and Casale.

Last night the International Sporting Club gave a banquet at which were present M. Flandin, French Under-Secretary of Air, M. Georges Prade, General Secretary and Clerk of the Course, MM. L. Blériot, de Lambert, Despujols, Leblanc, Dubonnet, etc. So far as one was able to discover M. Blériot was the only aircraft constructor present, and not a single well-known pilot was observed in the distinguished gathering. Needless to say, speeches were made, but eloquent and evidently well meant as they were, they will not bring the machines to Monaco for the competition.

The large Nieuport-Tellier-Sunbeam is still being erected at St. Raphael, and it is not known when it will be ready for M. Lecoite to bring over. The Breguets, it is said, will not be ready in time, and the Donnets and L. and O. are feared to be in much the same position. There is apparently a good possibility of the Caudrons turning up, but it is impossible to say when. The Savoias are said to be strike-bound in Italy, but it is hoped that this obstacle will be overcome by bringing them over by air about the middle of this week.

The only British representative, the Fairey, is sans a pilot, Nicholls having been called to America, and I understand that Mr. Fairey is scouring England for a pilot to fly his machine. With such short notice it is naturally a matter of some difficulty to get a pilot to fly a fast machine, but for the sake of the prestige of British aviation, it is to be hoped that he will succeed. Unless he does, it looks as if the speed and altitude contests will be fought for by two machines only—the Spad and the Nieuport, while the Tunis flight will be contested by the Nieuport-Tellier and the Savoias. I am informed that the French Naval Air Service is sending a squadron of ten machines, which may compete *hors de concours*. These are expected to fly over from Toulon at any time now.

Monaco, Tuesday, April 20.

Matters are moving along quite well. Last night, just before dark, M. Lecoite brought over from St. Raphael the Sunbeam-engined Nieuport-Tellier, No. 5, and this morning at 10 a.m. one of the Tellier-Hispano flying-boats with Pilot-Ensign Gisard and Chief Mechanic Castora on board, arrived from Toulon. This is one of the Naval flying boats of which a squadron will make the trip Monaco-Tunis-

Monaco *hors de concours*. Towards the end of last week it looked very much as if the unhappy Schneider affair at Bournemouth last year were going to have its French counterpart at Monaco. Of arrangements for the housing and launching of the competing machines there was little to be seen. A temporary (very) shed was being erected on the North quay, and an old pontoon carrying a passable imitation of a crane, operated by two men, was the only visible means of handling the machines. This, as a matter of fact, looked like being sufficient for the work in hand, as there were, at the time, only two machines here, the Spad and the Nieuport. Since then, however, things have improved somewhat, and the prospects are a little brighter. The French authorities have lent a vessel, the *Polyphème*, which, with its steam winch makes light of the beaching—or rather quaying and launching of the machines.

The Tellier-Nieuport flying-boat is of somewhat antiquated design, but given a certain amount of luck as regards weather it may succeed in "making the trajet." The boat, which has a pronounced Vee bottom stem, tapers to a point at the stern, which is well out of the water when the machine is at rest on the sea. A balanced rudder without fin is supported below on the aft portion of the boat, which is here of triangular section with the apex at the top, and above by a curious shaped member looking more than anything like an overgrown cucumber. From the front end of this member project two tail booms which run to the rear spar of the top plane, one on each side of the four-bladed pusher screw. As already indicated, the engine fitted on this machine is a Sunbeam, mounted as shown in the accompanying photograph. If the weather holds M. Lecoite intends to go up in this machine tomorrow for his qualifying flight (2,000 m. in not more than 45 mins. with full load of petrol and oil, and with a useful load of 400 kilos., representing mails, etc.). On the Tunis flight he will have with him Capt. Coli, who was navigator to Roget on his flight across the Mediterranean.

The first man out this morning was Casale on the Spad, whose long Vee-bottom floats bear a pronounced upward slope from the step to the stern, which appears to assist materially in getting-off and alighting, the machine making very little spray and showing no tendency to the uncomfortable-looking hoppety-hoppety-hop *amerrissage* which usually follows the employment of long floats. After a spin round Casale alighted smoothly.

This afternoon, about 5, he went up again for the altitude contest, but came down after a few minutes as his barograph had stuck. At a quarter past five the Nieuport was swung into the harbour, and Lecoite started his first altitude flight. The wide floats of this Nieuport are of the pre-War type, with a central three-stepped keel and a Vee bottom sloping slightly up to the chine, but which is turned into a horizontal plane just before meeting the chine. These floats cause rather more spray than those of the Spad, and the machine seems to require a somewhat longer run, but one imagines that in anything of a sea they will be superior to the long floats of the Spad. Once it is "unstuck" the

Nieuport climbs well, and in a short time the machine is but a speck in the azure sky. A few minutes before six, the official "closing time," Lecoigne alights, having reached as recorded by his barograph, a height of 5,330 m. This concludes the happenings for the day.

Wednesday, April 21.

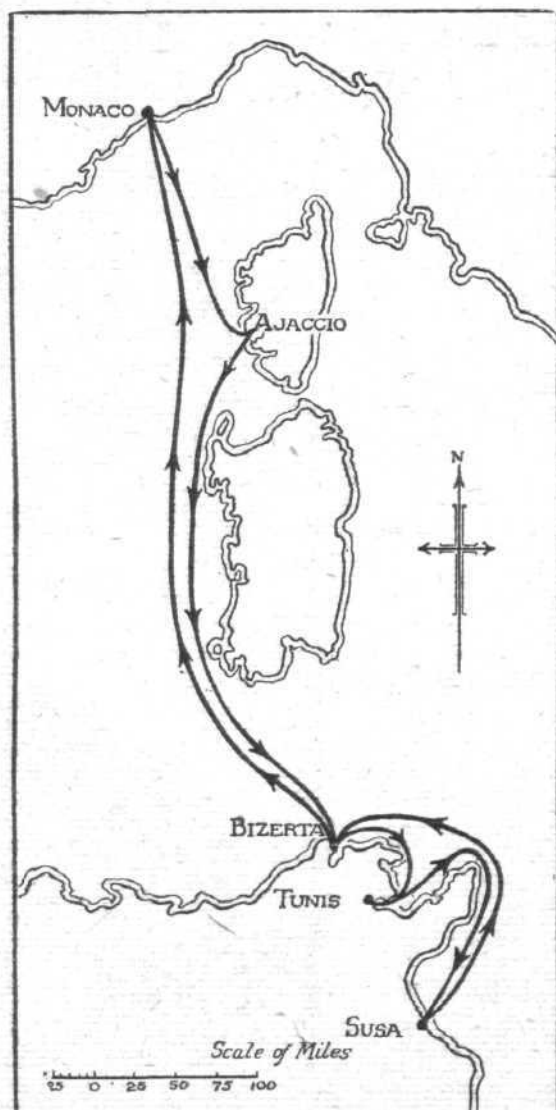
The first man out today was Casale, who was anxious to beat the altitude flight made yesterday by Lecoigne. The Spad rose easily and gracefully, but alighted again shortly afterwards, his height-recorder having again refused to record anything.

The Nieuport is swung into the harbour a little later, Lecoigne wanting to give himself more time than he had last night so as to try to improve on his previous altitude. Before he can get ready, however, an east wind springs up with Monegasque suddenness, and in an incredibly short time the sea outside is full of whitecaps, while even in the harbour itself there is a considerable swell running. This prevents the start for the time being, and during the afternoon the wind increases to a gale, precluding all possibility of any of the machines going up. Towards evening the weather moderates somewhat, and it is highly probable that by tomorrow morning there will be a calm sea.

The Caudron machines are said to have reached Toulon by air, where they will put their "slippers" on and proceed Monacowards. If the weather moderates the Caudrons, as well as some of the naval machines, may be expected here at any time.

There is no news here of the Fairey seaplane yet, and so far as is known the Portuguese boats (F 3's) are still at Calshot, waiting for better weather. Two Savoias are expected to arrive by air either tomorrow or the day after.

One cannot help regretting the absence of British machines. These should have been here—several Sopwiths, Supermarines, Gosports, Phoenix-Corks, etc. So far as one can see at present, the only really up-to-date seaplanes to compete in the Tunis flight will be the "Savoias." Unless Caudron has something up his sleeve, there will be no French machine of which any of our best seaplane designers need be afraid.



The course of the Monaco-Tunis, etc., flight.

The "Tellier-Nieuport" is certainly not in accordance with modern ideas of flying-boat design, and of the twin-float seaplane class there is as yet nothing here to compare with the Fairey—when and if it arrives. It would almost appear necessary to repeat Mr. Grahame-White's warning, painted on one of his H. Farmans in the early days of flying, "Wake up, England."

Monaco, Thursday, April 22.

To-day the weather is all that Monegasque weather should be. The sky is blue, with but few clouds, such few as do break up the azure blue being at an altitude sufficient to make any seaplane pilot envious. As a rule, the clouds hang very low, so that, even when the visibility at sea level is excellent, the "Tête de Chien" and other hills which surround the bay and harbour rear their summits well above the clouds. To-day, however, all the mountain tops in sight are clear of any clouds, and conditions generally point to an ideal day for flying. The sea is calm and promises well for getting off and alighting. One is therefore not surprised at meeting Lieut. Casale coming out from the headquarters of the committee with a barograph under each arm. He has had several disappointments during the last couple of days with barographs which baroed quite O.K., but which steadfastly refused to graph. To-day he is taking no chances and is carrying a duplicate instrument. Shortly after 11 the Spad is put overboard, and after being towed out, in the centre of the harbour, Casale opens out his Hispano and rises gracefully and with very little spray, the floats being well unstuck before he reaches the mouth of the harbour. The "Spad" climbs extremely well and is soon lost sight of.

On board the "Nieuport-Tellier" there is great activity; mechanics are repairing a faulty oil-cooler, and filling up with petrol and oil. Lecoigne and Capt. Coli, his navigator, will attempt the "acceptance test" of climbing to 2,000 metres within 45 minutes. They both assure me that they will have little difficulty in doing so, and voice their confidence in the Sunbeam engine. In the meantime, Casale has returned, and his barographs, which have worked this time, say that he has reached an altitude of 5,900 metres. I am not quite certain, but am inclined to think that this may be a record for a seaplane. If Lecoigne were not so busy with the large machine, there is no doubt he would soon be out with the little Nieuport, trying to go one better.

After lunch Lecoigne and Coli are ferried out to the boat, and shortly afterwards the "Nieuport-Tellier" is towed out in the bay. The Sunbeam engine is started and the machine makes a few short runs while the engine is warming up. The first attempt at getting off is unsuccessful, a wave hitting one of the wing tip floats and veering the machine off its course. The next one gives better results and the machine gets off, at 3.25, after a comparatively short run. Once off, she climbs pretty well, considering her large load, and, taking a wide circle, is soon lost to view in the direction of Nice. Shortly after 4 o'clock a machine is seen approaching. This proves to be Lecoigne's "Nieuport-Tellier," and from the fact that he has scarcely been away for more than the 45 mins. allowed for the climb, one guesses that he has passed the "acceptance test." The machine taxis right into the harbour under her own power, and one learns that an altitude of 2,200 metres has been reached in 30 mins. Thus the machine is permitted to start for Tunis any day desired.

News has just been received that a five-engined Caudron has arrived at Istres and will proceed to St. Raphael this evening. It may then be expected here to-morrow or Saturday. Four naval flying boats, which will make the flight to Tunis and back, are expected to arrive here tomorrow afternoon. As Nieuports have only one pilot here—M. Lecoigne—they will not be able to start in the speed race on Sunday (25th), but the organisers of the Monaco meeting have offered another prize for a speed race to be flown on the following Sunday, May 2. Unless the "Savoias" turn up during the next day or so, it looks, therefore, as if the "Spad" will have to fly the speed race alone. By the way, I understand that there is a possibility of the "Spad" attempting the Tunis flight. By doing it in stages (which is permitted) she could probably just manage to cover the longest course distance, and her speed is such that, even counting the time spent in refuelling, she would stand a good chance of doing the journey at least as quickly as the other competitors. It will still be remembered how Brock, on a Grahame-White-built Morane monoplane, won the London-Paris-London flight by not attempting to carry enough fuel for the complete journey, but alighting at le Crotoy for replenishing his tanks. It is just possible that by employing the same tactics the "Spad" may give quite a good account of itself. Much will naturally depend on the weather, as this machine would stand little chance in a rough sea.

Altogether things look considerably more promising than they did a couple of days ago, and one feels justified in hoping that some quite valuable data may be gathered from a competition which at first looked like being a complete fiasco. That Britain has not made a better showing is a source of the keenest disappointment to many, and although the Government may be partly to blame for the absence of any British aircraft in Monaco Bay, one cannot quite absolve British constructors. There are those who are so placed financially as to be well able to afford the expenditure entailed in sending a couple of machines down here for the competition, and the reputation of the Briton for being a good sportsman can scarcely be said to have been upheld by our constructors when only one has attempted to send a machine. That he has been prevented from taking part is an unfortunate circumstance, but one for which he is in no wise responsible.

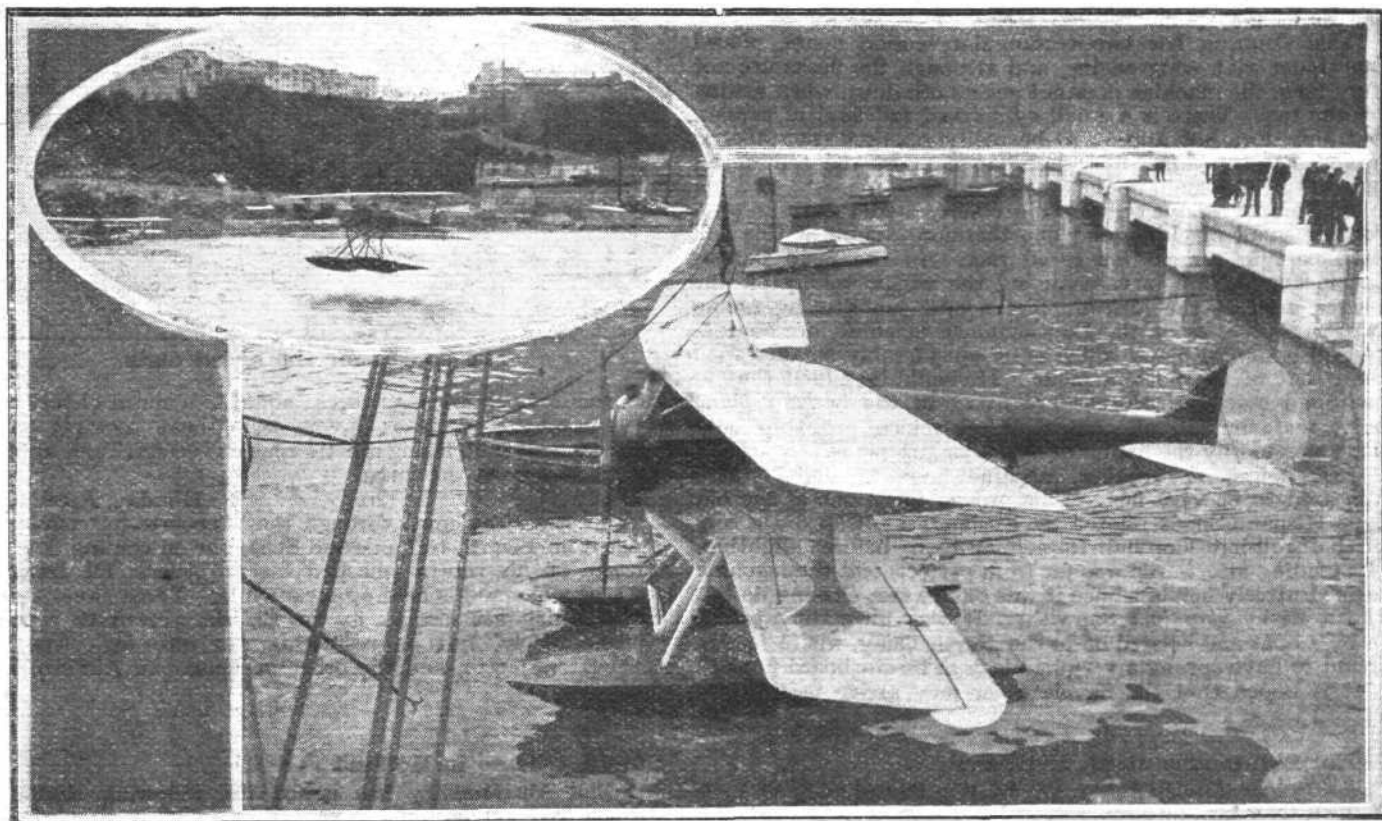
Monaco, Friday, April 23.

This morning the weather looks very promising, and there is apparently a good possibility of the Savoia and Caudron machines turning up. It is also said that an Italian Nieuport-Macchi is expected to arrive during the day, and several of the French Naval Air Service flying-boats are expected from

to six he makes an excellent landing in the harbour. The Spad floats, which are of the Vee bottom single-step type, long so as to avoid the use of a tail float, have the aft portion of their bottom sloping upwards to the keel, which apparently allows of landing the machine at or near its angle of maximum lift without causing porpoising. So far one has been unable to discover any tendency of the Spad to do this, either in getting off or alighting. It is true that it has been flown from a calm sea only, and its behaviour in a swell may be different. To return to the altitude flights: Casale's barograph is taken to the Committee room, where the seals are broken and the necessary corrections made. The height reached is—6,350 m., or exactly the same as that attained by Lecoite! The flights for the day have resulted in a dead heat. Both machines appear to have been practically up to their ceiling, and it is not without interest to note that the time taken in reaching this is almost the same for the two, Lecoite taking 1 hour 0 min. 7 secs. and Casale 1 hour 1 min. 30 secs.

Saturday, April 24.

Better late than never is an old saying, and accepting the truth of it one rejoices at being able to state that a start



AT MONACO: The Spad getting ready for a flight. Inset, the machine, piloted by Casale, off for an altitude flight. Note the long single-step floats.

St. Raphael. However, midday approaches and still there is no sign of any of these machines. After lunch Lecoite, who yesterday qualified for the Tunis flight by reaching 2,200 m. in 30 mins. on the Sunbeam-engined Tellier-Nieuport, has the little Hispano-Nieuport launched and is towed outside the harbour mouth in order to take off into the light breeze. Yesterday evening he intended to go for an altitude flight, but just before getting "unstuck" in the harbour mouth a wave struck the floats and the machine commenced to porpoise. By throttling down Lecoite avoided a spill, but abandoned the flight. Today there is less swell, and he intends to obtain all the assistance he can from the light wind blowing from the south-east. After a run which appears to be considerably longer than that required by the Spad, he gets off, and the little Nieuport climbs at a very good rate. The sky is clear and practically cloudless, and the machine is in sight for the greater part of its flight.

Casale, on the Spad, is getting ready and gets away at 4.20, making a beautiful start with a very short run. Shortly afterwards Lecoite alights, and after correcting the barograph, his altitude is found to be 6,350 m. The return of Casale is now awaited with interest, and at about a quarter

has at last been made on the Tunis flight. This morning at 6.51 Lecoite and his navigator, Capt. Coli, left Monaco on the Tellier-Nieuport with Sunbeam engine. The machine, which is a flying-boat of the two-stepped type, appears to be very "dirty" in getting off, but does not require a particularly long run, considering its size and weight. The weather is ideal, and there is every reason to hope that the machine will reach Bizerta during the day.

Another Tellier-Nieuport, but with two Hispano-Suiza engines, placed in tandem, one driving a tractor and one a pusher, has come over from St. Raphael, piloted by Ensign Hurel, who has with him Master Rodenant and Quartermaster Prigent, and is to attempt the Tunis flight, but after cruising around for some time, making several unsuccessful attempts at getting off, it returned to harbour, and is hoisted on to the North Quay. It appears that the boat is leaking badly, and one is unable to decide whether the pilot knew this but took the risk, or whether his boat had been so badly inspected that the leak was not discovered. In either case it would seem that somebody ought to be strafed.

Three other flying-boats, of the F.B.A. type, with 300 h.p. Renault engines, arrive from St. Raphael. These are num-

bered 40, 41, and 42, while the Tellier-Hispano boat is numbered 47. A three-engined Caudron, piloted by Poirot, also arrives, and is moored to a buoy. This machine is similar, in a general way, to the large cabin machine shown at the Paris Aero Show. It is, however, of smaller dimensions and has no enclosed cabin. The engines—three Le Rhones—are mounted as were the Salmsons in the Show machine, i.e., one in the nose of the fuselage and two on the wings, all driving tractor airscrews. This arrangement, for a given total engine power, would appear to possess certain advantages over the twin-engined machine with its engines on the wings. For instance, suppose the total horse-power is 600 h.p., with each engine placed 6 ft. out from the fuselage. In the twin-engine machine, if one engine stops, not only is the power reduced by half, but there is a turning moment of: Thrust of 300 h.p. by 6 ft., which has to be counteracted by the rudder. In the three-engined machine, if the fuselage engine stops there is a loss of only a third of the power and no turning moment. If one wing engine stops the resulting turning moment is only: Thrust of 400 h.p. by 3 ft. If the thrust h.p. is 4 lbs., the yawing moment on the twin-engined machine is $4 \times 300 \times 6 = 7,200$ lbs. ft. On the three-engined machine, however, the moment is only $4 \times 400 \times 3 = 4,800$ lbs. ft. Whether, therefore, one looks at it from the percentage loss of power or from the yawing moment point of view, the three-engined arrangement would seem to score over the twin-engine-on-the-wing system.

This Caudron has two rectangular section floats, placed one under each wing engine, and although the floats are not very long, the machine does not get its tail down when resting on the sea. There is a small cylindrical tail float of copper, but this does not appear to be really required, nor does it seem to be of sufficient volume to support the tail unless assisted by the main floats.

As Nieuports have only Lecointe here, there is now no pilot for the small machine, and one therefore doubts if this will take part in tomorrow's speed race. In the Spad hangar the mechanics are busy changing the wings, taking off the planes used in the altitude flights and substituting racing wings. These, as on the Bournemouth machine, are characterised by a top plane which is of considerably smaller span than that of the bottom plane. It should be added that in the Spad machines *ailerons* are fitted to the bottom plane only, and the lateral control is, therefore, probably only little affected by the fitting of a smaller top plane.

Just before 11 another machine hove in sight, which appeared to be very fast. This proved to be one of the old type Hispano-Spads piloted by Ensign Tece, who did a sort of half-roll-half-loop-half-Immelman-turn before alighting. His landing afterwards was far from perfect, and the machine seemed utterly helpless once it was on the sea, chasing its tail like a frisky pup (*not* Sopwith). It was ultimately towed in by a boat and hoisted on to the North Quay, where it was found to have sprung a very bad leak in its starboard float.

It is hoped that the Savoia racer may arrive in time for

this race, and its appearance is naturally awaited with the greatest interest as it is said to have attained over Lake Maggiore a speed of 300 kilom. (about 180 miles) per hour. If this prove true the machine is one of more than ordinary merit for a seaplane of the flying-boat type.

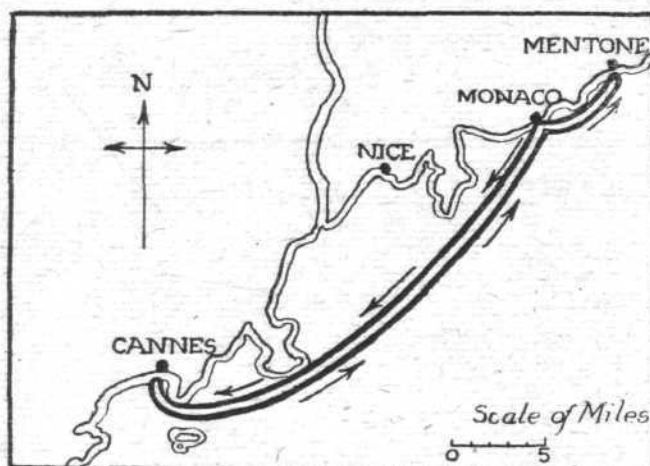
Later.

News has just come through that Lecointe and Coli on the Tellier-Nieuport, Sunbeam engine, arrived at Ajaccio, Corsica, at 8.48, and at Bizerta at 2.48.

A Savoia has just arrived, which proves to be piloted by Janello, of Bournemouth fame, who has come over by air, accompanied by his mechanic. He informs me that he hates travelling by train and has made the trip in the most natural way—by air. The racer is expected to arrive by road tonight or tomorrow morning. The machine in which he came over is one of the standard Savoias, type S 13.

Sunday, April 25.

The only happenings of importance today were the speed trials of de Romanet on the Spad and Janello on the Savoia. The Spad's time over the 80½ kilom. course to Cannes and



The course for the speed tests

Mentone was 22 mins. 52½ secs., equal to a speed of just over 131 m.p.h., while the Savoia flying-boat took 23 mins. 46½ secs.; Janello losing a little time at the start and appearing to go wide at the turns.

Monday, April 26.

A message has come through that Lecointe has made the stage from Bizerta to Tunis and Susa, but on coming down at Bizerta on his return smashed his propeller. He has sent for a new one and is held up meanwhile. Three naval flying-boats which set out to fly to Bizerta yesterday reached Ajaccio safely, but on restarting ran into fog. Two returned to Ajaccio, and the other put into San Antioso, Sardinia.

Aerial Lighthouse at St. Inglevert

THE Air Ministry has issued the following Notice to Airmen (No. 41):—

"An aerial lighthouse has been installed at the aerodrome at St. Inglevert (approximately E. by N. 7 miles from Cape Grisnez), and will be in operation every evening from sunset to two hours after sunset. Its characteristic signal is the letter 'A' of the Morse code, every eight seconds, thus:—Light half second, eclipse half second, light three seconds, eclipse four seconds."

Lille Aerial Lighthouse

THE Air Ministry has issued the following Notice to Airmen (No. 42) amending Notice No. 24, of March 9:—

"The aerial lighthouse at Lille aerodrome, in position Lat. 50° 37' N. Long. 13° 6' E. of Greenwich, has been allotted a new signal. This lighthouse will, in future, signal the letter 'B' of the Morse code (i.e., dash, three dots), once every ten seconds, and will be in operation every evening for a period of two hours, commencing at sunset."

Lyons Aerodrome

THE Air Ministry has issued the following Notice to Airmen (No. 43):—

"Three wind sleeves have been installed at Lyons (Bron) aerodrome, to assist pilots landing by day. Two of these 'sleeves' are red, and are situated on the western side of the landing-ground; the third is white, and is on the east of the ground.

"When there is no wind, machines should land and take off from south to north.

"Bron aerodrome is in a position Lat. 45° 44' N. Long. 4° 53' E. of Greenwich."

Summer Time in Holland

THE Air Ministry has issued the following Notice to Airmen (No. 44):—

"Summer time was introduced in Holland on April 5 and will remain in force until September 27."

Examination for Aviation Ground Engineers

THE Air Ministry announces:—

"Arrangements have been made to hold examinations for candidates desiring to become certified ground engineers (aircraft or engines), under Section 4 of the Air Navigation Directions, 1919, at the following centres during May and June:—

London	May 12, June 9	May 26, June 23	Manchester	..	May 20, June 15
Bristol	..	May 18	Leeds
Birmingham	..	May 19	Newcastle	..	June 16
			Glasgow	..	June 17

"A candidate may apply to be examined as a ground engineer to overhaul and inspect *all* flying machines and or engines, or for the examination of any named type or types of flying machine or engine.

"The examinations, which may be partly written, partly oral and partly practical, will be based on the syllabi outlined in Air Ministry *communiqué* No. 499 issued on March 5.

"Candidates desiring to be examined can secure application forms from the Secretary, Air Ministry, London, W.C. 2, and should submit their completed forms of application accompanied by a fee of 5s. at least seven days prior to the date on which examination is desired. Candidates should also state at which of the above places they wish to be examined."

THE HANDLEY PAGE AIRCRAFT DEAL

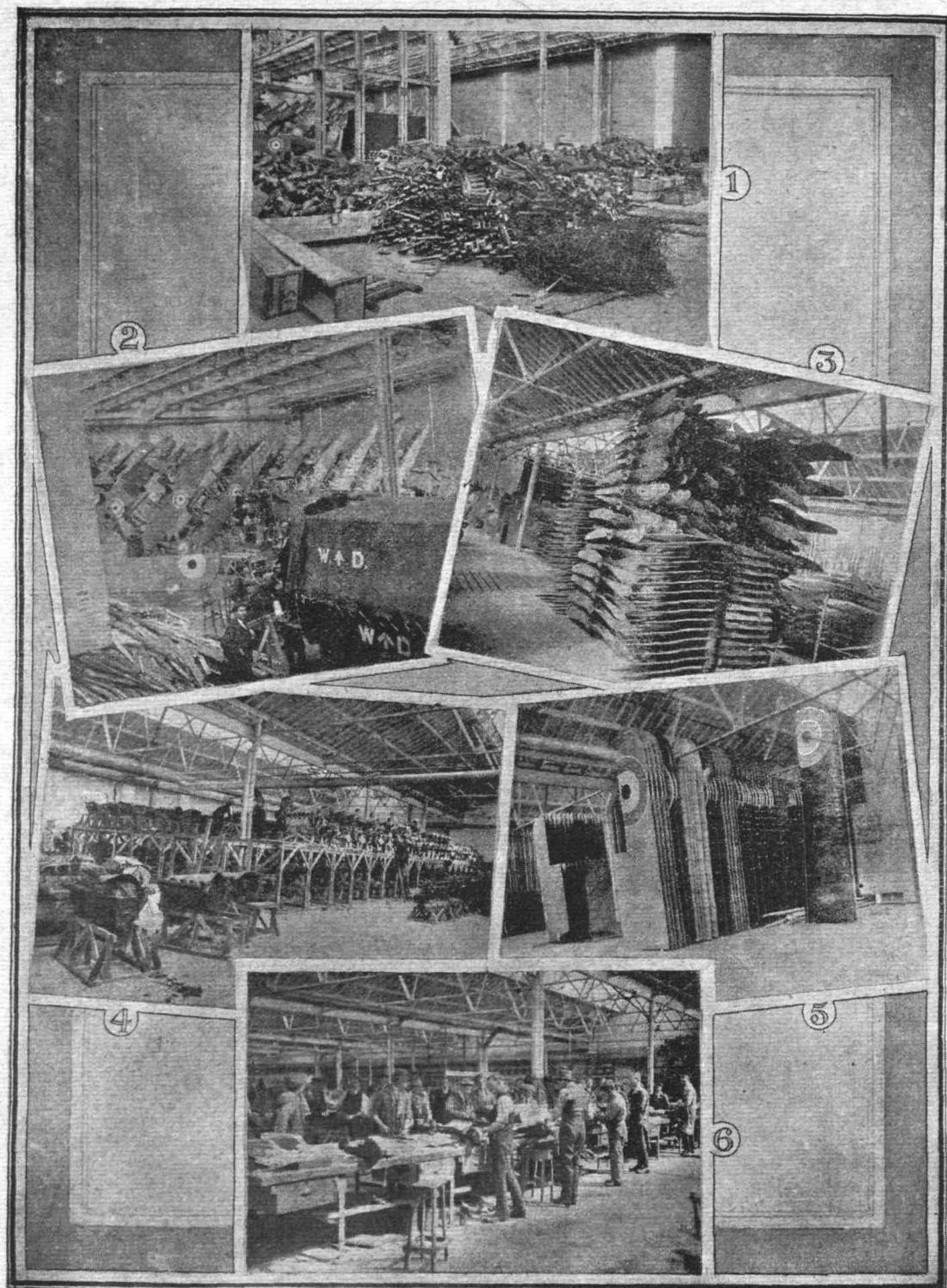
AN extremely impressive and interesting visit to Waddon Aerodrome was organised by Messrs. Handley Page, Ltd., last Friday for the purpose of disclosing—if only to a small extent—the vast nature of the undertaking of the Aircraft Disposal Co., Ltd. The gathering of visitors was worthy of the event, consisting as it did of representatives of many industries and many countries. As a display of magnitude, this visit to Waddon was a marvel in itself, not to be easily forgotten, but the mind almost failed to grasp the situation when it was casually pointed out to us that the material we were seeing was only a fraction of the whole purchase from the Government. There were similar depôts scattered in sundry parts of the country, and presumably even the world. It is impossible to convey in words all that was seen. Suffice it to say that we passed—following an apparently endless white line!—through numerous “sheds” in which were stacked, packed and piled literally acres of aeroplanes, aero engines, airscrews, landing-gears, rev. counters, compasses, and other instruments, magnetos and starters, carburettors, wire strainers, bolts, nuts, pins split and pins not, sundry other accessories not recognised at the moment, airship and kite-balloon materials, etc., etc.—all to the Nth power! Amongst the aeroplanes we recognised many well-known and successful types, such as Handley Page bombers, D.H. 9's, D.H. 4's, D.H. 6's (“Sky-Hooks”), Avro 504 K's, Martinsydes, Bristols, Sopwiths, S.E. 5A's, F.E.'s, Vickers, Beardmores, etc. It seemed that all known types of engines were represented, but we were “moved along” too often to allow a complete inventory being made. We noticed that all those engines that had seen service had their log-books hung neatly round their necks, so that no one need buy a “pig in a poke.”

Following this impressive inspection, details of plans of the Aircraft Disposal Co. were briefly entered into at a luncheon—a welcome solace for our dazed brain—at the Savoy, at which Lord Londonderry, Under-Secretary of State for Air, presided.

The Marquess of Londonderry said they were commemorating an arrangement of very far-reaching importance. While he could lay no claim to being an expert, and while he was what was termed a politician—and politicians were usually regarded with thinly-veiled suspicion—there was nothing lacking in his enthusiasm to do his best to further the great science of aviation, which had potentialities which we could hardly envisage. The transaction which had taken place was one of which they had every reason to be satisfied. While they were all in favour of private enterprise, and while they believed that the Empire had been built up by the initiative and enterprise of individuals, there was a position which the State could take up which would assist those individuals rather than hamper them, and in the arrangement which had recently been made they saw the best principles of that theory. The Government, as the disposer of property, was always in a difficult position, and therefore, in his official capacity, he welcomed the advent of an organisation which was prepared to carry out the undertaking in the best interests of private enterprise. The transaction was one of immense magnitude. The handing over had consisted of 10,000 aeroplanes, 30,000 aero engines, and large quantities of material and accessories. This monument erected by the War represented 100 years development in the ordinary course. The whole of these stores had been handed over for the sum of £1,000,000, and 50 per cent. benefit accrued to the Government for any profit which resulted on the undertaking. This, he felt, was an arrangement of which he, as the representative of the Government, had every reason to be satisfied. That was not all. The Government was not altogether indifferent to the other 50 per cent. The long arm of the Treasury touched all profits and all income—and they might rest assured that the Government were not losers on the transaction. The Government might be criticised for having handed over to a company something in the nature of a monopoly, but he was prepared to contradict that absolutely. They had handed over to a firm, which was capable of disposing of aircraft and accessories, property which any Government would have had great difficulty in disposing of. The arrangement had many advantages; it provided opportunities for circulating throughout the world the product of British industry, and it provided an opportunity for advertising British machines and the enterprise of the British constructor. In this venture they owed a debt of gratitude to Mr. Handley Page. The Air Ministry perhaps had come in for a greater degree of suspicion than any other department, but there was no hanging back on their part. The Ministry were not wondering whether

aviation was going to be a success. They were convinced that it would be, and they wanted to establish the science on the lines on which it could progress as thoroughly as possible. It had such a great future before it that it was not possible for most of us to envisage. It was quite a mistake to imagine nothing was being done by the Civil Aviation Department. On the contrary, it was often difficult for the Ministry to keep pace with what was being pushed forward by Sir Fredk. Sykes and his department. The chairman concluded by proposing the health of Mr. Handley Page.

Mr. Handley Page, having expressed the regret of Mr. Godfrey Isaacs, chairman of the Aircraft Disposal Company, at being unable to be present, said that they had seen at Waddon some small portion of the material acquired from the Government. It was difficult to visualise the whole amount. That depôt was but one of six which had been taken over, and which were equally full, and the contents of 130 more stations, crammed full of the result of British brains, had to be sorted out and turned over to the company. Whilst the material was originally destined for aircraft work, enterprising business men and manufacturers had found that it was readily adaptable for other purposes. Such things as the 500 to 1,000 tons of ball bearings, 350,000 sparking plugs, 100,000 magnetos, bolts, nuts, and small accessories were finding a ready sale with the present shortage of manufactured goods. Out of the enormous stock of instruments which they had, instrument sets for motors were easily made up. The revolution counters could be changed into speedometers, and the aneroid barometers for registering height into barometers for telling the weather. The steel tubes previously used for aircraft had been bought up by enterprising bedstead manufacturers to change into bedstead frames, and the R.A.F. wires for bracing the planes were being used for the cross-slats of a bedstead frame. Propellers had been widely used for hat stands and clock cases, and discarded instrument cases for the family cruet. The greatest enterprise, however, had been shown by a firm who had solved the housing problem and the provision of facilities for summer travel by purchasing under-carriages from aircraft, and fitting on top of them a light caravan body, furnished with the material available from the stores. In engineering work a great quantity of material was also being utilised. Engines which were designed for aircraft work ran most satisfactorily on town gas. For instance, the Sunbeam “Arab” engine, which developed 200 h.p. as an aircraft engine, with its gearing removed was running at a slower speed as a most efficient electric plant engine developing 50 h.p. Such a unit took up but a small space, and thus enabled the small electric light plant to get over its period of bad load without unduly taxing the normal capacity of the other plant. Such an engine could be purchased at a very small price compared with the large slow-speed gas engine which would otherwise be required. But all these were but side issues to the main problem of the disposal of aircraft, and it is to this that the company had directed their ends. Machines could now be purchased at a cost which was only a small proportion of the original cost to the Government, and a country inaugurating a national air programme could thus get through the development period at a very low cost. The military side of aviation did not exhaust the possibilities of air work. Today air transport was slowly but surely taking its place among the many facilities for the carrying out of quick commercial transactions. There was no question to his mind as to the certainty of air transport occupying a prominent position in future business development. On the Handley Page service between London and Paris, for instance, they had carried 67,811 lb. of freight, and flown 97,428 miles without injury to a single passenger or loss of a pound of freight, and this was but a beginning. They, therefore, looked with great confidence to the opening up of further facilities and the use of machines such as they had for carrying out the services. His company was not tied down as a government to conduct its business in a stereotyped way. They could extend greater facilities for payment and start perhaps new enterprise which would not be otherwise possible. It would be their endeavour to work in the most harmonious relations with all those firms whose machines will be dealt with by the company, and this question had been frankly and freely discussed with them and an outline of the way in which they could work laid down. Today the prestige of British aircraft stood higher than any in the world, and even nations who had had foreign aircraft, pushed by expeditions, sent to their shores, and foreign demonstrations conducted regardless of expense, had realised that the machines offered were not



SCENES AT THE AIRCRAFT DISPOSAL CENTRE AT WADDON AERODROME.—1. A heap of old metal parts waiting to be sorted. 2. A corner of the store for De H. 9 machines, showing the method of stacking. 3. A few of the propellers which are available. 4. Various types of engines being cleaned up and classified. 5. The method of stacking spare wings. 6. One of the workshops where the disassembling and sorting are carried out

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so good as those from this country. It was early to give the results of the sale of aircraft by the new company, but he could state that in the short period of their existence they had sold many more machines than the Aircraft Disposal Board during the whole period of its existence. It would be their endeavour to push still further the sale of British aircraft abroad, and to remove the impression that sometimes existed that Britain lagged behind in selling efforts abroad.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

RIGID AIRSHIP CONSTRUCTION

[2016] People who are engaged in rigid airship construction will read with great interest Mr. A. E. Rankin's article published in last week's *FLIGHT*. The subject that he touches on is of first importance; in fact, upon its solution depends the ultimate success of rigid airships, if they are to gain favour with commercial firms.

It is the opinion of the writer from experience gained, that the production of these elements has reached a very successful stage, that is of girders of the type shown by Mr. Rankin in Fig. 1. By the application of running jigs, dies, and multiple rivet press tools, used at present in the manufacture of these girders, the suggestion of omitting two-thirds of the rivets in their construction would not, it is considered, reduce the labour to such a large extent as given. Admittedly the present rivets used are far stronger than need be theoretically, but it has been found in practice that the double rivets in the palm of the bracing member give the best results. It must be noticed that the bracing elements are usually of such a fine gauge (in many instances only .02 in thickness) that constructors have to rely largely on the clamping power of the rivets. As the rivets are of superior strength in shear, the bracings fail by tearing away from the rivets at their connection on the channel members. Another reason for adopting the double rivet at both the head and where the bracings cross, is to ensure that the fluting or embossed section of these members are preserved where they run over the lip of the channel. (See Fig. 1.)

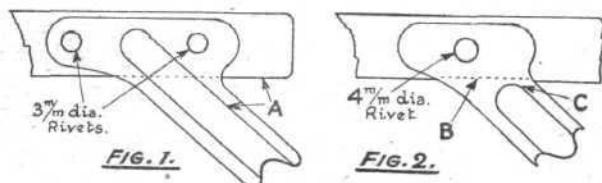


Fig. 1, Method at present in practice. Fig. 2, Mr. Rankin's proposed method. A, Fluting runs right over lip of channel. B, Part of bracing which would be a source of weakness in compression. C, Fluting would have to stop here in one of the bracings forming the cross

This is an important point which is obvious. A badly-formed flattened end seriously reduces the efficiency of the member as a strut. It is, therefore, our experience that single riveting in girder construction at bracing connections is bad, and should be avoided wherever possible in practice.

It has also been found that the time occupied in the manufacture of the girders for a rigid airship is only approximately a third of the time expended in the actual assembly of the airship at the erection-shed. Clearly this means that

the method of assembly is at fault, and in the writer's opinion this is where investigation is needed.

Standardisation in design, not necessary in size of ships, but in girder design and hull fittings and parts, with a more general use of jigs, dies and fixtures, would assist construction materially towards rapid production. The writer is also of a strong opinion that most valuable service should be obtained from shipbuilders in this direction. It has been noted with regret that so many auto and mechanical engineers have been employed on staffs erecting airships, who by virtue of their training in these branches are apt to consider the problems arising in much the same way as the erection of an intricate piece of machinery. However, one would indeed like to hear further opinion expressed.

Much can be done to cheapen the production of rigid airships, and thanks are due to Mr. Rankin for opening a subject of such interest to airship constructors, and to those contemplating the commercial service of these vessels.

Newcastle-on-Tyne.

S. H. PHILLIPS.

THE SIDE-SLIP LANDING

[2017] Together with other regular readers of *FLIGHT*, I recently noted Mr. F. Courtney's article on "Airbrakes and Side-slip Landings," and was in full agreement with his views. I was, therefore, considerably surprised to read "E. J. D.'s" letter which implies that side-slipping is not necessary.

If E. J. D. can glide into an aerodrome from any height without using his engine and come in just over the boundary every time at 10 m.p.h. above his stalling speed, I consider him a very clever pilot, and it is a great pity he is lost to the industry. He also remarks that he does not remember a machine that would run far once it had touched the ground. I beg to inquire if he has ever flown a D.H. 9A (Liberty engine), and if he has within what reasonable limits does he call "far."

Regarding his paragraph on finding the stalling speed, adding 10 m.p.h. and gliding down, then holding the machine off until it "settles," I think this savours too much of flying by instruments rather than by instinct, and I am sure the majority of pilots will agree with me when I say this is a dangerous practice.

"Why glide at a speed so much in excess of the landing speed that an air brake is necessary?" asks E. J. D. For several reasons, the chief being that it is safer in bad weather, and if one can land well and safely in bad weather, the landings in good weather are comparatively easy.

I also do not agree with E. J. D. when he says that correct side-slipping takes practice, and I maintain that this again is a question of instinct, and, further, that it is very easy to land on the exact spot chosen—easier, in fact, than by the straight glide.

L. T. P.

Secretary of the Air Ministry

THE Secretary of State for Air has appointed Mr. Walter F. Nicholson, C.B. (Assistant Secretary of the Admiralty), to be Permanent Secretary of the Air Ministry in succession to Sir Arthur Robinson, K.C.B.

Mr. Churchill's Air Secretary

THE Secretary of State for War and Air has appointed Lieut.-Col. J. T. C. Moore-Brabazon, M.P., as his Parliamentary private secretary in respect of the Air Ministry.

Air Ministry Accounts

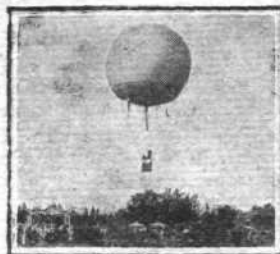
ISSUED as a White Paper on Tuesday, the appropriation account of the Air Force Services for the year ended March, 1919, together with the Report on them of the Comptroller and Auditor-General, are in the nature of an "inquest" on the period indicated. It has been impossible to deal with them in the present issue, but we hope to refer to the matter next week.

Medical Examination for Civilian Pilots, etc.

A BOOKLET dealing with the medical examinations for civilian pilots, navigators and engineers has been issued by the Department of Civil Aviation, Air Ministry. The matter has been prepared by Lieut.-Col. C. B. Heald, Medical Adviser to the Department, and explains the methods of examination fully and illustrations are given of some of the apparatus used. Those who are interested can obtain copies of the booklet from the Stationery Offices, price 6d. net.

Aerodromes and Landing-Grounds

THE Air Ministry has just issued a consolidated list (Notice to Airmen, No. 40) of the aerodromes and landing-grounds open to civil aviation. This contains all additions and amendments up to April 1, 1920. Owing to the great pressure on our columns it is impossible to reproduce this list, which is only provisional, in full, but copies can be obtained by those interested from the Air Ministry.



THE COMMERCIAL FUTURE OF AIRSHIPS

By Air-Commodore E. M. MAITLAND, C.M.G., D.S.O., A.F.C. (Royal Air Force).

(Concluded from page 457.)

(4) *Comfort.*—Comfort in aerial transport is essential if it is to have any extended future. The advantage of this speed is completely thrown away if the passenger on landing is physically or nervously exhausted, and has to recuperate before carrying out the object of his journey. In the large airship this need never be. Ample accommodation can be provided, both sitting accommodation during the day and sleeping accommodation at night.

It is suggested that in passenger cars special attention should be given to the importance of giving each passenger a good view, the windows so arranged that they can see both outwards and vertically downwards should they wish to do so.

Passengers could sit facing each other with a table between them, rather like a large Pullman car, and they could arrange the chairs and tables for bridge as they felt inclined. Sleepers will be provided in the shape of bunks which fold down and allow the passengers to sleep athwartships. My experience up to date is that one sleeps uncommonly soundly in an airship. On the first night of our journey in R. 34 to America I went to bed at 9 p.m. and slept soundly till 9 a.m. next morning.

The whole of the passenger car will be heated by steam generated from the engine. Air will be admitted at the forward end of the car, where it will be warmed over radiators. The pressure inside the car will be maintained slightly higher than that outside, so that if there are any leaks in the side of the car warm air will be passing out, rather than cold air passing in. This will prevent draughts and ensure an even and suitable temperature.

The car will be arranged so that it will not be necessary to restrict smoking any more than in a railway carriage, as the car will be completely isolated from any possible risk of fire from gas or petrol. A kitchen with at least as good accommodation as any railway restaurant-car will be provided, and our experience to date is that one's appetite in the air is extremely good.

One is struck by the absence of vibration and noise in a large airship, and the absence of smoke or dirt generally is a distinct asset. Compared with transport by sea, the almost complete absence of sea-sickness is an important consideration. Being a shockingly bad sailor myself, I can sympathise with others, and I can assure you the motion such as there is in a large airship is so slow that there is no excuse whatever for sea-sickness.

Pleasures of Travelling at Low Altitudes

I shall never forget the feelings, not only of myself, but of every member of the crew of R. 34 as we passed over Nova Scotia on our outward journey to New York last June. We were all feeling rather jaded, having been 59 hours on end over those weary wastes of water in the Atlantic, and the joy we felt at again passing over *terra firma* is difficult to describe.

And such a country we found spread out beneath us! Huge expanses of dense forest on every side with hardly ever a sign of habitation—lakes, rivers, and here and there a tiny clearing where an enterprising settler had succeeded in penetrating. We were only 800 ft. above the trees and going very slowly against a head wind, and there appeared to be no detail that we couldn't see. We could see the trees each settler had cut down during the previous winter neatly stacked and looking exactly like little bundles of asparagus; we could see where he got his water, the extent of his housing accommodation, and the amount of land he had cultivated. We could tell the nature of the soil. We got quite an insight into the rainfall of the country; the types of trees which did best; the bird life; depths of the lakes and so on; the natural drainage of the country stood revealed, and last, but not least, the glorious smell of those pine woods acted as a refreshing tonic and put new life into us.

(5) *Speed.*—The time taken over the whole journey is the important factor, and the actual air speed is not the sole consideration, although obviously of great importance in reducing the time taken.

In considering long journeys of 1,500 to 2,000 miles, the intermediate landings for refuelling or for trans-shipment, if relays are provided, must necessarily greatly increase the time for the whole journey. Further, the question of flying throughout the night is a most important factor in the time required for the journey. Airships have a great advantage in the fact that they maintain a continuous air speed throughout the 24 hours, and owing to their great range have no intermediate landings. A continuous land speed of 60 m.p.h. is reasonable to assume. It should also be remembered that the airship, by deviating from its course, can take advantage of favourable winds or slants, or at the worst the effects of unfavourable winds can thereby be very considerably reduced. It is, therefore, safe to assume that on the average this air speed will be made good over the ground. Where trade winds, monsoons, and westerly drifts can be made use of, which will be the case on many of the routes, the speed made good can, and will be, considerably increased.

Assuming, therefore, an air speed of 60 m.p.h., and allowing for the probable effect of wind on the various routes, our principal Dominions can be linked up independently of bases in foreign countries as follows:—

Journey	Intermediate Landings (½-day halt allowed)	Duration of Flight	Present Mail Transit
England to Egypt ..	0	2 days	4-6 days
England to India (via Egypt)	1	4½ days	14 days
England to S. Africa (via Egypt)	2	6 days	17-19 days
England to Australia (via S. Africa)	3	10 days	25 days

Night flying is of the greatest importance, and it is here that airships are of special value. In fact, it may be stated that airships can be more easily and efficiently flown at night than in the day time. If a passenger can leave after dinner, sleep comfortably on board, and reach his destination in time for breakfast next morning, where, owing to existing means of transport, it would have been necessary to spend, say, 24 hours in the train or boat, a great saving is achieved. Thus, one complete business day would be saved, provided always that the accommodation is sufficiently comfortable not to impair the efficiency of the passenger. The journey between London and Copenhagen is an admirable illustration of this.

(6) *Cost.*—If I were asked suddenly today "Is the big airship a commercial proposition or is it not?" I should hedge a bit and say, "Now, this is rather a difficult question you've asked me!" but having recovered from my astonishment, I should reply: "I am convinced that the big airship will be a commercial proposition, but I am not in a position to say that it actually is today, for the very good reason that it has not yet been proved one way or the other." Airships have not yet had an opportunity of showing what they can or cannot do commercially. Up till now they have only been used for military purposes in this country. I say advisedly "in this country," because in Germany they have been tried out very considerably for commercial purposes, and the answer they would give in that country to the question I have so carefully shirked would, without doubt, be in the affirmative!

I will now endeavour to give you some idea of the cost of rigid airship transport. I think you will agree with me

that at the present stage of development of the airship this is a most difficult subject, as although many notable flights have been carried out by our own and German rigid airships under War conditions, yet these flights have only proved that there are great possibilities in the airship for commercial purposes, and have not produced sufficient data to enable actual running costs under commercial conditions to be stated. Considerable experience, however, has been gained during the past three years which is sufficient to warrant certain conclusions, and on the assumption that these conclusions are correct, it will be possible to form some idea of the cost of this form of transport.

I propose to consider an airship of 2,750,000 cub. ft., similar in size to airship R. 38 now building at Bedford in the Government airship dockyard. As I have previously pointed out, an airship of this size would be capable of carrying 15 tons for a journey of about 50 hours' duration at a continuous air speed of 60 m.p.h. I propose to assume that this airship would fly about 2,500 hours in the year, and on an average would make good a ground speed of only 45 m.p.h. (although I am personally confident that a ground speed of nearer 60 would be made good). This would make the yearly ground mileage covered about 112,500 miles. This amount of flying allows the airship to be laid up for three months in the year. From past experience it is considered that this amount of flying will be considerably exceeded by airships operating on long-distance routes.

The Cost of Airship Transport may be divided into:—

- (1) The cost of the airship.
- (2) The cost of the base.
- (3) Cost of operating the airship.
- (4) Cost of running the base.

(1) *The Cost of the Airship.*—The War cost of an airship of 2,750,000 cub. ft. (R 38) is approximately £400,000, but this cost must not, I feel, be taken as a guide to the future cost of construction. To justify this statement I must point out, in the first place, that the airship industry is a comparatively new industry. Progress in design was rapid and construction was slow, so that airships were obsolete long before they were completed. Standardisation of production was, therefore, impossible. Progress in design also led to alterations and improvements during construction, which, of course, meant delay and consequent increased cost. For these reasons, amongst others, airships in this country took anything between fifteen to twenty months to build, whereas in Germany, where development permitted a degree of standardisation, airships of about 2,000,000 cub. ft. (R. 34 size) took only three to four months to build. I, therefore, feel, and I am not alone in the matter, that as soon as something approaching a regular airship construction trade is established the cost of a commercial airship similar in size to R. 38 will be under £200,000. I must also add that future airships will be of more rugged and simple construction than those built in the past, with the object of attaining low first cost, cheapness of maintenance and a longer life. I, therefore, propose to take the cost of such an airship at £200,000.

(2) *The Cost of the Base.*—A commercial airship base will consist of housing sheds, gas plant, workshops (situated in the annexes to the sheds) for fabric workers, carpenters, engineers and allied trades. Landing rights over surrounding ground will be required, the extent of which will depend on local conditions. (I should mention here that any ground reasonably flat, the quality of the surface not being important, is suitable for landing.)

The cost of establishing such a base with a shed to house two 2,750,000 cub. ft. airships, with all necessary equipment and plant, including a fair margin for such services as drainage, water supply, roads, but excluding cost of land, accommodation for station personnel or hotel for passengers, would be about £550,000 on present-day prices. I may point out in passing that housing sheds can easily be lengthened to meet development provided they can be built sufficiently high and wide in the first instance.

A similar base, but with shed to house one ship, would cost £400,000.

An additional £25,000 would be required to erect and equip one mooring-mast at a base.

A mooring station would consist of a mooring-mast complete, gas plant, and small office and store accommodation. The size of the gas plant would depend on the amount the base is used, but a base with gas plant to produce sufficient gas for, say, two airships calling once a week would cost about £45,000 on present prices.

The cost of the bases may appear high. It must be remembered, however, that only about five bases will be sufficient to allow services to be run to all parts of the Empire.

Bases will gradually be increased in size, and extra sheds will become necessary for repair purposes as traffic increases.

An argument invariably produced against airships is the prohibitive cost of their bases. It is interesting, therefore, to take a wide glimpse into the future. Let us make, for example, a liberal estimate of the possible future airship requirements of the Empire, and assume that this is completely met by a fleet of, say, 120 airships. This enormous fleet, with the aid of mooring-masts, could be efficiently operated from five bases mentioned above, allowing for six sheds at each base. The capital outlay involved for these bases and attendant mooring-stations would be something in the neighbourhood of ten millions.

To get the right perspective, one must compare this capital outlay to the hundreds of millions laid out in permanent ways for railways, and to the enormous sums expended in docks and harbours for shipping.

(3) *Cost of Operating the Airship.*—This may be divided into: 1, maintenance; 2, depreciation; 3, crew; 4, gas; 5, fuel.

Before any idea of cost of maintenance and depreciation can be obtained, it is necessary to state the probable life of an airship and its parts. For this purpose the airship may be divided into: (i) fabric; (ii) engines; (iii) hull.

With regard to fabric, this may be subdivided into: (a) outer cover; (b) gasbags.

Present experience enables the life of the outer cover to be placed at one year (2,500 hours flying), and that of the gasbags at 2½ years.

With regard to engines, owing to the fact that airship engines are not run at their full power except in emergencies, the life can be placed at 2,500 hours, or one year.

With regard to the hull, the opinion of those best qualified to judge places the life at not less than five years. Tests of the duralumin of No. 9 rigid after three years' use showed no weakening whatever. The life of the hull I, therefore, propose to take as five years.

(1) *Maintenance.*—Under this heading is included the necessary repairs and overhauls to the fabric, engines and hull, and replacement of fabric and engines during the life of the airship. The sum required under this heading is estimated at £40,000 per annum, or 20 per cent. of the first cost (£200,000), and this sum will be included in the operating costs.

(2) *Depreciation.*—Assuming a five years' life for the whole airship, a sum of £40,000 per annum will be required, which will enable the airship to be replaced at the end of its estimated life (five years), and this sum will be included in operating costs.

(3) *Crew.*—Allowing salaries slightly in excess of those now paid for equivalent work on Service airships, the yearly cost of the crew would be £9,000.

(4) *Gas.*—From experience during the War with present-day methods of producing gas, assuming that the plant would be kept reasonably fully employed, the cost should not exceed 15s. per 1,000 cub. ft., which would be a net cost including maintenance and depreciation charges on the plant. The consumption of gas, assuming 2,500 hours (112,500 miles) flying per year, may be taken as 16,000,000 cub. ft., which would cost £12,000, or 2s. 2d. per mile made good over the ground.

(5) *Fuel.*—Based on present-day contract prices for petrol and oil, the cost under this heading throughout a year may be taken as 5s. 6d. per mile made good over the ground. I may mention here that R. 34 in her Transatlantic flights averaged 1½ gallons of petrol per mile made good. The above charges may be summarised as follows:—

	£
(1) Airship maintenance	40,000
(2) Airship depreciation	40,000
(3) Flying crew	9,000
(4) Gas	12,000
(5) Petrol and oil	30,937

£131,937

Or, on the yearly flying basis assumed, this would amount to 23s. 5d. per mile.

(4) *Cost of Running the Base.*—A description of a base has already been given, but the cost of running such a base must now be considered. 120 skilled men would be sufficient to run the gas plant and do all repairs to visiting airships; a further 50 unskilled workmen would be required for rough work. Allowing £5 per skilled and £3 per unskilled man per week, this would amount to a yearly charge of £39,000. I propose to allow a round sum of £12,000 for overhead charges (for such items as salaries, office expenses, etc.).

Thus, the yearly cost of this base would be £51,000. Of the 170 men whose wages are included in this figure, I estimate 90 would be available for landing parties. However, until landing to a mooring-mast is in general use, this number would not be sufficient, and I must, therefore, allow for a further 200 unskilled labour for this purpose. Although this labour might in certain places be engaged as required, I propose to base my costs on the assumption that they must be permanently employed. Assuming they are also paid £3 per week, this would mean a further yearly expenditure of £31,200, bringing the total yearly expenditure to, say, £82,200.

I do not wish to enter into a discussion on the very important question of the ownership of bases, and I therefore propose, for the purpose of this paper, to assume, for example, that the Governments concerned would erect these bases on lease to a company for a yearly rental of 6 per cent. of the cost of erection. I would like to add here that the rental suggested should be more than sufficient to cover depreciation, maintenance and repair charges. In my opinion, these bases would be national assets, and a large cash return on the cost of erection could no more be expected from such an outlay than from money spent in harbour works, such as breakwaters, channel dredging, etc.

The total yearly cost of the base, including the rental suggested above, will, therefore, amount to £116,700.

A mooring-station, such as has been described, would require about 20 skilled men, which would include gas-workers, engineers, drivers, clerks, etc. A further 10 (unskilled labour) would also be required. Allowing a wage of £5 and £3 respectively, this would entail a yearly cost of £6,760, to which must be added depreciation, maintenance, and overhead charges. I propose to allow a total of £12,000 for the running of this station.

The yearly charges of bases and mooring-stations, on these assumptions, may be tabulated as follows:—

	Double shed base	Mooring station
Rental (6 per cent. on £575,000)	£ 34,500	£ 5,240
Overhead charges	£ 12,000	
Personnel (permanent)	£ 39,000	£ 6,760
Landing personnel	£ 31,200	
	£116,700	£12,000

Cost per Ton-Mile

I have now outlined the probable "all in" costs for a complete airship service. To reduce the cost of running the base-to cost-per-mile, operations on an actual route must be considered. I do not want to take some case which is only capable of fulfilment in the distant future. As I have already stated, airships in the future will undoubtedly only use their sheds for repairs, and in this way the percentage which each ship must bear of the terminal costs will be considerably reduced. I propose to assume that each ship operating will have its own shed accommodation, and I will, therefore, consider the case in which there are two bases, each with one double shed, also one mooring station, and that airships actually under construction (R 38 type) are employed.

I must mention that in order not to complicate my conclusions I have assumed that one company is running both airships and bases.

I have allowed a sum for working capital, but I have not shown any charge for, may I call it, head office expenses, advertising, etc., but on the other hand, neither have I allowed for any revenue from special charters, advertisements, and many other ways in which a commercial airship company would earn additional revenue.

The route I propose to take is England—Cairo—India. I am assuming the two stages of the journey will each take 50 hours. I also allow a half-day stop at Cairo. England and Cairo would each have a double shed, and India would have a mooring-out base, which I have shown, at Karachi. The four airships would each fly 2,500 hours per year, which it will be remembered, allows for a three months' lay-up for each ship every year. This would permit of a weekly service being run each way from England to India.

The cost of the service on the assumptions taken is as follows:—

Capital Expenditure	£
Cost of four airships at £200,000 each	800,000
Cost of mooring station at Karachi	45,000
Working capital	200,000
	£1,045,000

Interest on capital expenditure and reserve fund (15 per cent.)	£ 156,750
or say	157,000

which is equivalent to 7s. per mile flown over the ground.

Cost of Operating the Airships

As previously stated, 23s. 5d. per mile flown over the ground.

Cost of Running the Bases per annum

English base	£ 116,700
Cairo base	£ 116,700
Mooring station, Karachi	£ 12,000
	£245,400

which is equivalent to 11s. per mile made good over the ground.

Tabulating these costs, I arrive at the following:—

Interest on capital expenditure, 7s. per mile made good.
Cost of operating the airships, 23s. 5d. per mile made good;
Cost of running the bases, 11s. per mile made good;
or, an "all in" cost of 41s. 5d. per mile made good over the ground.

As I have already stated, each of these four airships would carry, as a conservative figure, 15 tons of commercial load, for a journey occupying 50 hours, which would make the "all in" cost per ton-mile 2s. 9d. for such a journey.

Allowing seven passengers to the ton, which for practical purposes amounts to each passenger being allowed 1 cwt. of luggage free, and one ton of mails at 6d. per oz., for each stage of 50 hours, the following table is of interest:—

Airship	Approx. Time of Transit	Mails (1 ton carried)	Passengers	Steamer Approx. 1st class passenger fare
England to—				
Egypt	2 days	6d. oz.	£50	£45 to £50
India	4½ days	1s. oz.	£100	£65 to £70
S. Africa	6 days	1s. 3d. oz.	£120	£70
Australia	9½ days	2s. oz.	£190	£115 to £128

The above figures are based on airships actually under construction (R 38 class), and show a profit of 15 per cent.

Conclusion

In conclusion, it may now be fairly stated that the airship itself can be regarded as having successfully emerged from the experimental stage, but we have yet to prove the airship to be of commercial value. To prove it we must try. I think you will agree with me there are good prospects of success.

The criticisms invariably levelled against the airship are slow speed, irregularity and high cost. I hope I have clearly answered these three criticisms.

With regard to speed, it has been shown that over long-distance routes such as I have mentioned, the airship, far from being slow, sufficiently reduces the present time of transit to alter entirely our accepted views of distance.

Then, as regards regularity, commercial airship flying has been highly tested in Germany with successful results, and over the routes shown on the chart, with the assistance of the mooring-mast, I have every reason to believe that regular services will be maintained.

Finally, as regards cost, my estimates have been based on a British airship actually under construction, and also on what I consider to be conservative assumptions.

Progress in airship performance has been most marked during the last few years, and each successive class shows great improvement over its predecessor. I feel, therefore, I am fully justified in assuming a further increase in performance in the 4,000,000 cub. ft. airship, such as could be designed having regard to the many improvements which would be incorporated both from the point of view of better performance and cheaper construction. The reason I did not base my estimates on this class of ship was that she is not being built, although she could be constructed and housed in existing sheds. If, however, a cost per ton-mile is worked out for such a ship, making reasonable allowance for operational improvements, a very material reduction from the 2s. 9d. per ton-mile previously quoted will result. I estimate the "all in" costs of such an airship at 1s. 9d. per ton-mile.

It is common knowledge that one of our chief national assets of today is our mercantile fleet, and I feel sure that a British commercial airship fleet of the future will be of similar value. It will assist in maintaining the security of the Empire and will also provide the means of bringing our scattered Dominions in closer touch with the Mother Country.

AIRISMS FROM THE FOUR WINDS.

So the National War Museum is certain of a four years life at the Crystal Palace, as that is the term arranged by the executive at an annual rental of £25,000. As we have always pointed out, aviation will form quite a section in the "exhibits" and we are in no way surprised to learn from Sir Alfred Mond that the R.A.F. alone had offered really interesting material enough to entirely fill the huge Sydenham building. From an aeronautical point of view the museum will be worthy of many visits after the opening by the King on June 9.

DURING a highly interesting lecture, one of a series on X-Rays, at the Royal Institution, Major G. W. C. Kaye last week stated that it had been found possible to penetrate 3 in. of steel, 6 in. of alloy, and 12 in. of wood by X-Rays. Lead was a much more effective resistant with the result that operators could obtain complete protection by about one-eighth of an inch of this metal and so obviate further martyrdom as attended the many pioneers. Radiograph slides were shown giving illustrations of the practical application of the science to commercial and other purposes. In this connection Major Kaye said that radiography had shown flaws in the cylinders of aeroplane engines, and so prevented accidents. The conical end of a petrol tank was shown, and it was clearly demonstrated that the job had been scamped. There were rivets on the outside, but these rivets had no inside heads. Similarly, a radiographic examination of the steel axles of under carriages had disclosed a serious defect. The axles had been drilled in the wrong position, and the holes had been simply filled up with metal and filed over. An entire lot was rejected in consequence, and very probably serious disaster was averted.

Aviation owes, indeed, a debt of gratitude to science, not least to X-Rays.

THAT the recent "kidnapping to ransom" carried out by the Afridis at Peshawar resulted in a fiasco, by reason of the kidnappers lifting the wrong woman, carries with it a cause for congratulation. But the incident, nevertheless, has a direct interest to aviation, as when the abortive abduction was discovered the British C.O. speedily sent out aeroplanes and cavalry in search of the woman kidnapped and she was "spotted" by a pilot, wandering about; evidently lost. A patrol was at once sent out to bring her in, and when found was clad only in the remnants of a nightdress, the only garment she was wearing at the time of her seizure.

ACCORDING to the *Petit Parisien* the methods of the Germans in carrying out the clauses of the Peace terms, in regard to handing over aircraft and other war material, is about as bad as it can be. General Masterman, head of the Allied Commission of the Air Control, is said to have so reported last week to the Ambassadors' Conference in Paris. Deliberate opposition, the General states, had been made to attempts at checking the quantity of war material, every obstacle had been put in the way of the mission on its journeys, and everywhere the German officers had adopted a hostile attitude. Not only this, but theft of aviation material had taken place, in spite of the prohibition clauses laid down in the Peace Treaty; depôts of war material had been discovered in the neighbourhood of Berlin, and fresh construction was being carried out in secret.

It would appear to be about time that Mr. Lloyd George *did* insist upon the carrying out of the terms of Peace being hurried up a bit.

It is to be hoped that the idea of using aeroplanes for locating the Russian vessel "Solovik" drifting in the grip of the ice in the Kara Sea, with its 80 helpless occupants, may be successfully carried out. Otherwise the rescue of these poor souls by the British ice-breaker "Sviatogor" may prove impossible. The searchers might easily get within close range of the drifting vessel and yet, without the far-seeing 'plane, have no clue to its nearness. Little doubt that in the days to come most vessels will carry for emergency their small 'plane, just as they now always have their complement of life-boats.

BRITISH weather is proverbially erratic and probably the most varied in the world. Evidently London doesn't mean to take a back seat in keeping up our reputation, as the other day, when we on *terra firma* were enjoying (?) a solid downpour of rain, the pilots of the Paris-London air express after landing, reported that the Clerk of the Weather's "follow" up above was a solid snowstorm, through which they had had to fight their way to the lower strata of "demnition" rain.

It was quite a chapter of events which attended the burglary tactics of one Charles Ney the other day, who selected the Highbury residence of Mr. Herbert Spencer, the famous aeronaut, for the scene of his operations. It was, moreover, a pretty brisk rough-and-tumble business apparently, as Mr. Spencer explained at the Police Court, where his uninvited



One of the Supermarine four-seater "Channel" flying boats, the type which was tested by Gen. Sykes during his visit to the Supermarine works at Southampton last week

guest was arraigned, that Ney, whom he found in the dining-room, struck him in the mouth, hurled a marble clock and a supposed revolver (really a pair of opera glasses) at him, and threatened him with a table-knife. Ney, pursued into the garden, threw a brick and climbed over a wall, half of which collapsed. Other evidence showed that Ney climbed on to a garage, fell through a skylight, entered another house by a back window, and passed into the street, where he was caught. Although covered with blood and suffering from broken ribs, he resisted arrest with a broomstick.

You need to be light and airy to tackle at sight a flighty customer of Ney's calibre. And this sport was the full three-score years and ten!

IN a novel direction the use of aircraft is foretold and advocated by a correspondent in the *Observer*. He states that although everyone has heard of the Newfoundland sealing industry, it is not, perhaps, so generally realised how short, and therefore how strenuous, is the time annually allotted to this undertaking. The sealing fleet leaves St. John's in the middle of March, and the season ends with the month; so it will be seen that every moment gained is of value, and that any means by which an addition to the "bag" may be obtained is of the utmost importance, especially as the sealing fleet suffered losses during the War which the present cost of shipbuilding makes it an expensive matter to replace.

The object is to get as many young seals as possible (each of which are worth about 15s.). These young seals are born in the beginning of March on large icefields known as "whelping ice." Time is often wasted when locating herds (or "patches") of seal; indeed, even when once spotted, the task becomes complicated by reason of the drifting or breaking up of these floating tracts.

An airship patrol would, the correspondent thinks, prove invaluable at both tasks, all the time keeping, of course, in close and constant touch with the fleet, and would in all probability double the harvest; whilst there would be no need to add to the present (reduced) number of vessels employed. The natural character of these regions being obviously unfavourable to forced landings, such work is naturally more suited to the airship than the aeroplane, the patrol, having to adopt the military tactics of the troops of Midian, and "prowl and prowl around." Indeed, the rather desolate and rigorous character of this part of the world is particularly suited for demonstrating the many-sided utility of airships, since no other type of aircraft is equally suited to the rôle of continuous vigilance; such as is necessary to the duty of discovering and reporting interruptions, accidents or difficulties in communication and transport; or changes brought about on land and water by sudden and varying weather conditions.

ARE aeroplanes liable to catch foot-and-mouth disease? It sets one wondering when it is stated that an aviation meeting, which was to have taken place in Berne, on April 18,

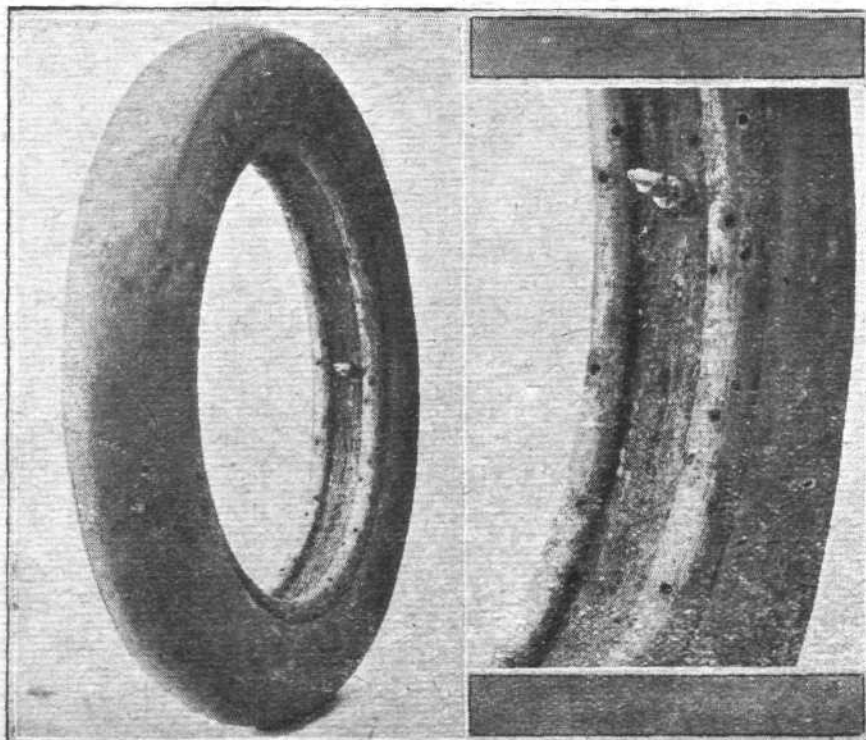
was abandoned on account of the prevalence of foot-and-mouth disease.

QUITE a delightful little "family gathering" took place last Friday evening at the Connaught Rooms, when the members of the Airship Officers' Club foregathered for their Annual Dinner under the Presidentship of Air-Commodore E. M. Maitland, C.M.G., D.S.O., R.A.F. There was little of the usual formality attending these functions, *bon camaraderie* of the "craft" being the keynote of those who had assembled to celebrate. A few congenial guests, including Comdr. Land, U.S. Navy, who at the Air-Commodore's paper on the Wednesday, had perpetrated the *bon mot* that in connection with the encouragement of commercial aeronautics the "Government seemed willing to provide the air," helped to cement the feeling of good fellowship.

Also supporting the Chairman were Air-Marshal Sir Hugh Trenchard, the Earl of Hardwicke, Comdr. Sir Trevor Dawson, Comdr. F. E. M. Boothby, Maj. E. Perry, D.S.O., Group-Capt. Halahan, Maj. Scott, C.B., Col. Lockwood Marsh, Wing-Comdr. Cave-Brown-Cave, Col. Lucan, Maj. Herron, Maj. A. Verney Cave, Maj. A. Congreve, Col. A. D. Boston, V.C., and other friends from the U.S.A., including Maj. Hall, Comdr. Dyer and Lieut. Coil. In spite of such a goodly representation, a feature of the evening was "no speeches"—except two, by order of President Maitland. But in those two—which were extended to four—there was some real "meat" much appreciated by the company. Thus it was comforting to learn from the Chairman that in his view the military side of aircraft now looked healthy, although the commercial side was hardly so robust a plant, but still hopeful. But when he came to sport, enthusiasm ruled, for then Air-Commodore Maitland gave solid facts for his claim that the Air Service had carried off most of the laurels worth bothering about.

AIR-MARSHAL SIR HUGH TRENCHARD, following the lead of the Chairman, was crisp, short, and to the point in his remarks. "All that fly in the Air is the Air Service," he claimed. The Air Service was one, and always would be one, and one only. By the reception of his utterance one was set wondering where all the resistance made so much of in certain quarters against the "One Service, one Uniform, One Badge," really existed. Apparently it had no rabid supporters present upon this occasion. Again "Boom" was practical and trenchant as ever when he admitted that the cutting-down in the Service had been drastic, but that this was but the prelude to the inevitable, that the rise to full maturity might be the sooner and higher. After giving some remarkably encouraging figures of past work, Sir Hugh affirmed that the future held as good prospects of further development as it had achieved during the War. There was a great chance, he said, for the airship in Mesopotamia in conjunction with 'planes, and he foresaw the airship as a leader of squadrons of 'planes in the future, as one of the directions of expansion

Somewhat unique photographs of a Palmer landing-wheel and tyre, believed to be part of the equipment of a Bristol fighting machine which went down in the North Sea during the War, and which was seen to sink by the crew of the seaplane which rescued the pilot. The wheel was washed ashore at Clacton during the past week, and was salvaged by a visitor from Derby and sent to the offices of the Palmer Tyre, Ltd., in London, where it is now on view. An examination showed that the eyelets which held the streamline shields had rusted away, and the once highly-plated and polished rim had become corrugated and scaled by the action of the sea-water. All the spokes of the original wheel had rusted away close up to the rim, and as a consequence the rim and the tyre became detached from the hub, and being still inflated at the time it naturally rose to the surface and was washed ashore. As a non-return valve was fitted to this particular tyre, it was not possible to apply the pressure gauge when the rim and tyre came to hand, but so far as can be judged this Palmer cord tyre, after so many months' immersion in the salt water, still stands at the same inflation pressure as when the aeroplane left the ground on its last flight



which he believed the Airship Service had before it. And with the development of the Service, civil and commercial use of the airship would move forward.

COMDR. LAND, of the U.S.N., who made a humorously serious speech hoped to see England develop the airship and lead the way for expansion. That meant the United States would follow, and develop likewise. Propaganda from Britain was wanted, and that would help both countries.

AFTER Sir Trevor Dawson, one of the special "two" speakers, had stated that he was convinced that when the time came and the money was forthcoming, as it would be, we should see airship services encircling the globe in all directions, the company resolved itself into merry little round-table parties, as airship service club members should. Thus ended a very delightful and clubable evening, with a feeling of regret that the gathering was but once a year (for the present, may we venture to hope).

ROYAL AERONAUTICAL SOCIETY NOTICES



Lectures.—Major-General Sir F. H. Sykes, Controller-General of Civil Aviation, took the Chair at Sir Sefton Brancker's paper on "Aerial Transport from the Business Point of View" at the Royal Society of Arts, at 8 p.m., on Wednesday, April 28.

Major Linton Hope will read a paper on "Notes on Flying Boats" on Wednesday Evening, May 12.

Donations.—The Council desire gratefully to acknowledge the gift of a set of lantern slides from the Aircraft Manufacturing Co., Ltd.

Election of Members.—The following members were elected at the Council Meeting held on the 20th instant: *Associate Fellows*: Major B. C. Carter, C. E. R. Osman, Capt. P. W. Smith, O.B.E.; Major P. Litherland Teed, Lieut.-Col. L. F. R. Fell, A. P. Cole, Capt. D. Nicolson, Capt. D. E. Riddell. *Members*: Capt. P. D. Acland, R. J. Fullwood,

Lieut.-Commander M. Hori, J. B. Maclean, C.B.E. *Associate Members*: R. M. Papilian, W. J. Wilson, S. E. Taylor, Flight-Lieut. R. S. Capon.

Library.—A complete set of Technical Memoranda 1-15 has been received from the Air Ministry and has been placed in the Library for reference by Members. Copies of the Technical Report of the Advisory Committee for Aeronautics for the years 1915-1916 may be obtained at the Society's offices, price 8s. net.

British Imperial Antarctic Expedition.—The following Committee has been appointed to consider the aerial plans of the proposed expedition to the Antarctic: Air-Commodore Bagnall Wild (Chairman *ex-officio*), Squadron-Leader H. C. Carter, Squadron-Leader J. E. M. Pritchard, Colonel H. T. Tizard, and Squadron Leader H. E. Wimperis.

W. LOCKWOOD MARSH,
Secretary.

A Blackburn for the India Flight

FROM the Blackburn Aeroplane and Motor Co., we learn that they are entering a Blackburn "Kangaroo-Rolls-Royce" to be piloted by Mr. Reginald W. Kenworthy, in the flight to India and back for the *Daily Express* £10,000 prize. We understand that with characteristic enterprise the *Yorkshire Evening News* is bearing the expense of the venture, apart from the aeroplane itself. Mr. Kenworthy, the chief pilot of the Blackburn Co., as *FLIGHT* readers are aware, has had lengthy experience with the Kangaroo machine, having flown it successfully at the Dutch Aero Show at Amsterdam, carried the Glasgow mails during the railway strike, and, more recently, been carrying out the trips between Yorkshire and Amsterdam.

Le Bourget Aerodrome

THE Air Ministry has issued the following Notice to Airmen (No. 45):—

"A wireless telegraphic aerial has been set up on the eastern side of Le Bourget, 7 miles N.E. of Paris. This obstacle is marked by fabric pennons during the day, and a white light at night."

R.A.F. Cadets

THE Air Ministry makes the following announcement:—
"The total number of Royal Air Force Cadets (including Colonials) dispersed up to April 7 was 21,284. Of these 3,060 have been gazetted to temporary commissions and 8,980 to honorary commissions. Ex-cadets of the Royal Air Force who were under training at the date of the Armistice and who have not been notified of their gazetting to honorary commissions as Second Lieutenants should apply to the Secretary (P. 4 B), Air Ministry, Kingsway, W.C. 2, stating full Christian names and surname, regiment (if any) and regimental number, Army rank (if any), Royal Air Force number and date of dispersal."

To Our Readers

As we continually receive complaints from readers that they experience difficulty in obtaining their copy of *FLIGHT* promptly each week, we draw their attention to the subscription form which is printed on page xxii of the current issue. If this is sent, accompanied by the appropriate remittance, to the publishing offices, 36, Great Queen Street, W.C., it will ensure *FLIGHT* being received regularly each week upon the day of publication.

H.P. London, Paris and Brussels Air Services

On the Handley Page Continental Air Services run in conjunction with Cie. Messageries Aériennes, Paris, between September 2, 1919, and April 17, 1920, inclusive, 1,218 passengers and 66,318 lbs. of freight have been carried over a distance of 90,299 miles.

To Honour S.A. Flyers

THE Imperial Air Fleet Committee have arranged to hold a luncheon at the Connaught Rooms on May 5, to welcome

Lieut.-Col. van Ryneveld and Maj. Brand, who recently flew from London to Cape Town. Tickets, 15s. 6d., may be obtained from the office of the High Commissioner for South Africa, 32, Victoria Street, S.W., or from the Canadian Liaison Office, Room 642, Air Ministry, W.C.

Royal Aero Club v. Stage G.S.

SOME interesting golf was seen at Wimbledon Park on April 24, when the Stage Golfing Society beat the Royal Aero Club. In the singles the Stage Society won by eleven matches to four with one match halved, and in the doubles by five matches to two with one match halved.

Beach Flying at Brighton

AT a recent meeting of the Brighton Town Council, Alderman Titcomb, moved that there should be no flying from the beach this year; it only brought in £50 a year, and was a nuisance and not an attraction. Alderman Pankhurst said it was intended to prohibit low flying, so that inhabitants would not be subjected to the nuisance from the machines that previously obtained. He hoped the Council would not take the retrograde step of abolishing flying. The motion was rejected.

An Echo of a 1916 Zepp Raid

AMONG the catch landed by a steam trawler at Lowestoft on Saturday was a large quantity of airship wreckage, including a piece of framework. It is supposed to be that of a Zeppelin destroyed in November 28, 1916, off Lowestoft.

The Leeds to Holland Service

ADDRESSING the Hull Chamber of Commerce a few days ago, Mr. Robert Blackburn, of Leeds, suggested that merchants in Leeds, Bradford and Hull should co-operate and guarantee a minimum weekly load. He stated that at present the cost of the service between Hull and Amsterdam was £150 each way, or approximately 3s. per lb., but that could be reduced by half by a direct flight. A resolution was carried urging the Government to allow mails to be carried by the service, and pointing out that such method of transport would be beneficial to the commercial community.

An Aerodrome in Bechuanaland

ON his return to England to take up duty as South African liaison officer with the Air Ministry, Colonel van Ryneveld paid a tribute to King Kana of Bechuanaland, who had a complete aerodrome built at his capital at his own expense for the use of the aviators.

Colonel van Ryneveld said his three outstanding impressions were first, flying for hours and hours over a limitless sea; second, flying for miles and miles over the desert; and, thirdly, flying over vast tracks of virgin forest.

Their actual flying time from Brooklands to Cape Town was 109½ hours; they were only held up twice—once for ten days at Cairo, and once for twelve days in Bechuanaland.

Major Brand is to resume his duties as an officer in the R.A.F.

THE AERODYNAMIC PROPERTIES OF THICK AEROFOILS SUITABLE FOR INTERNAL BRACING

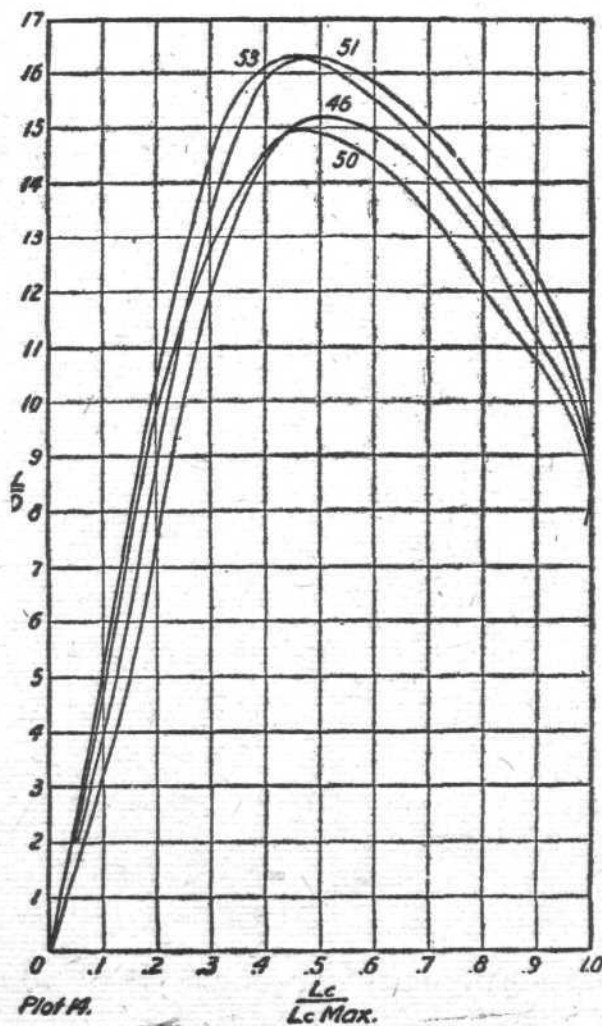
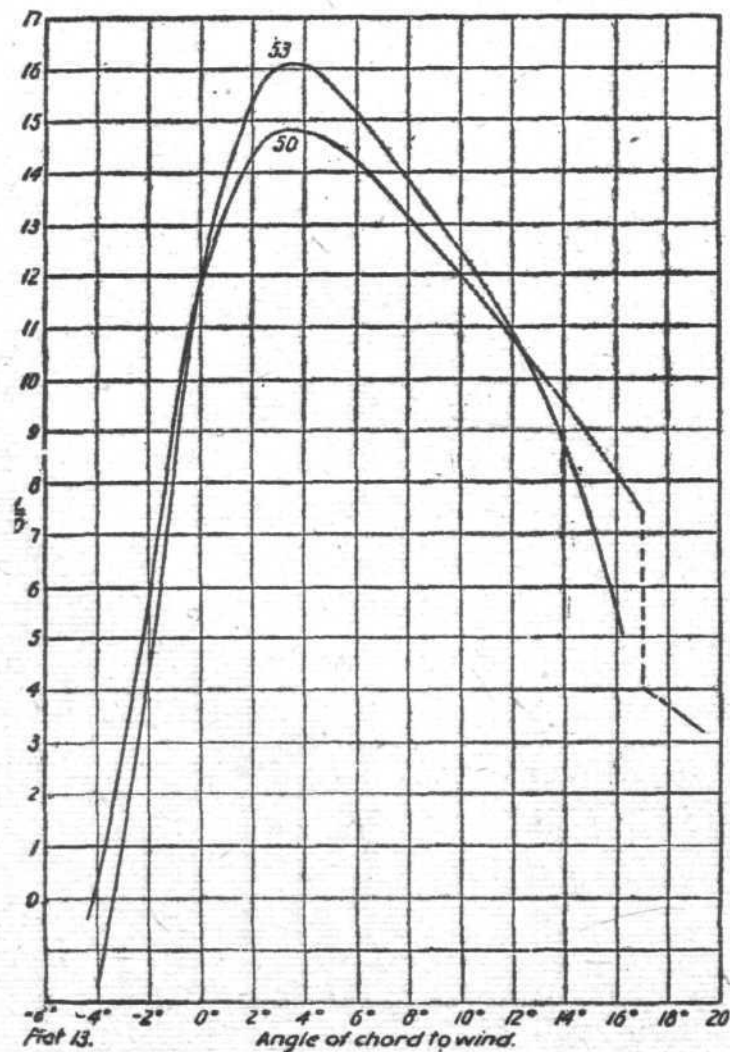
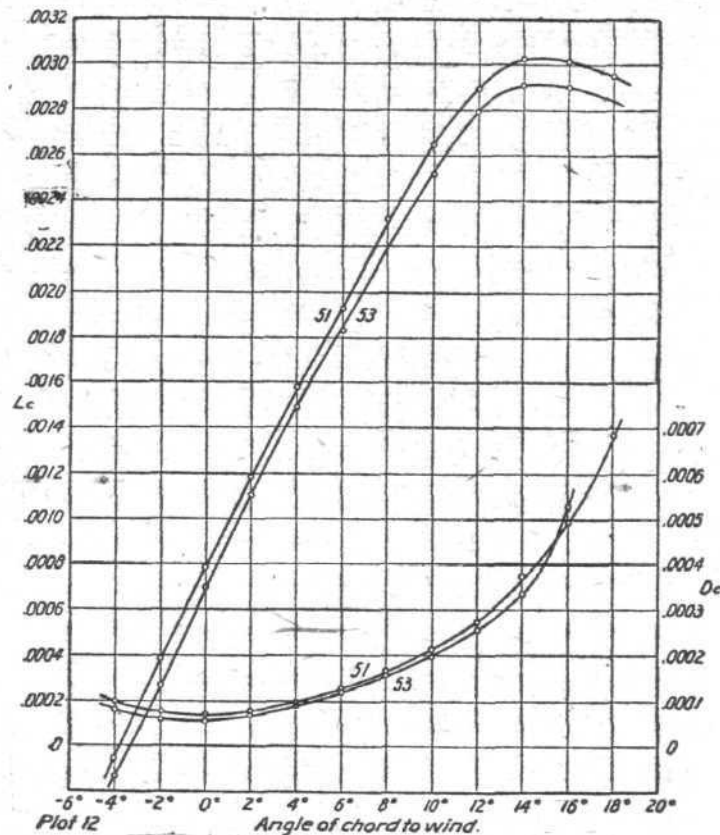
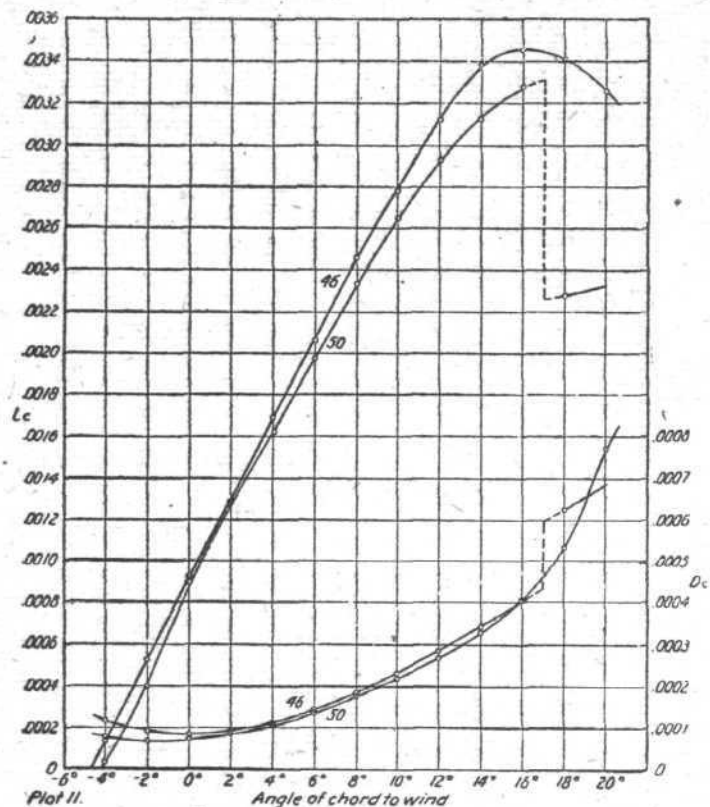
BY F. H. NORTON

(Continued from page 451.)

The Effect of Adding a Convex Lower Surface to a Thick Tapered Wing

As the limit of thickness is reached with a flat-bottomed section when h/c equals 0.158, it is intended to determine

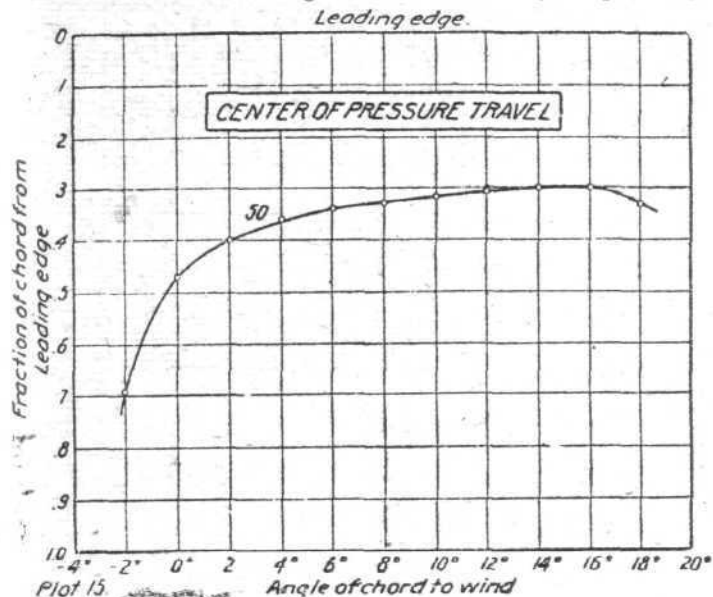
the effect of adding a convex lower surface to wings No. 46 and No. 51, so that the h/c ratio will be increased to one-fifth at the centre (Fig. 16). These sections, No. 50 and No. 53, have the lower surface reduced in the same manner as the



upper surface is reduced in going from the centre to the tips. The spar room is increased 25 per cent., and the general performance of the section is improved by this addition, making this one of the few changes that are both structurally and aerodynamically beneficial.

Adding a convex lower surface of this type gives the following results:—

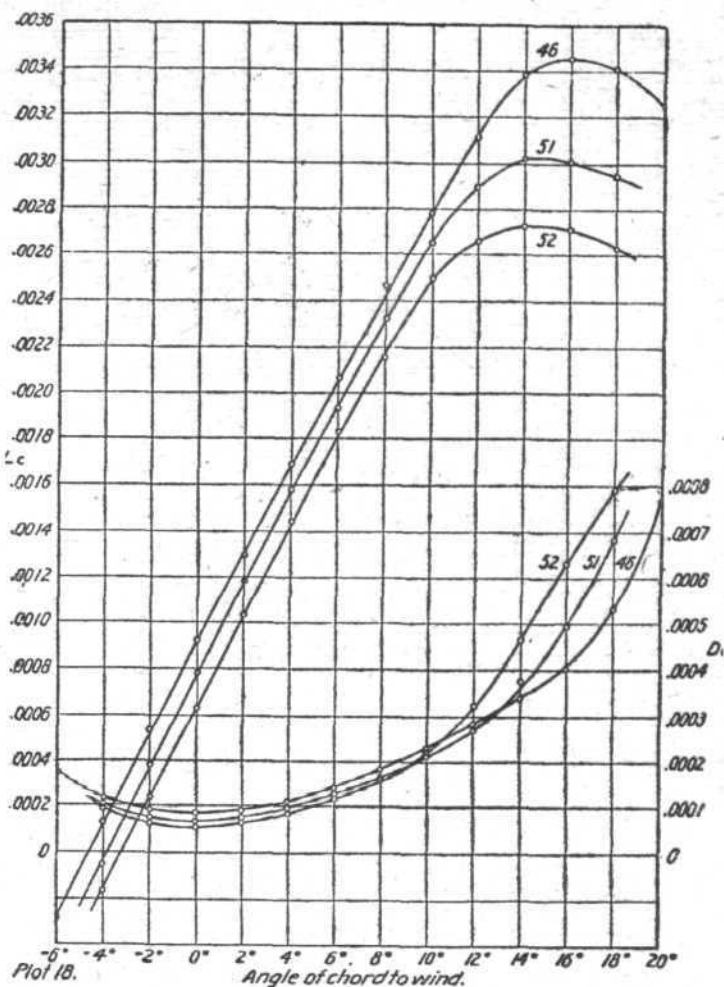
Lift.—The maximum L_c is reduced 3 to 6 per cent. The lift is reduced at all angles, but at 0° and 4° is quite high,



giving a decided hump to the curve at this point. This characteristic was noticed when a convex lower surface was added to the Durand 13. Section No. 50 gave an unstable burble point at 30 m.p.h., but at 40 m.p.h. gave a very flat maximum with the same value of L_c . (Plots 11 and 12.)

Drag.—The drag is lowered at all angles except near the burble point, and the position of the minimum is moved to more negative angles. The minimum is lowered about 20 per cent., and has a flatter curvature (Plots 11 and 12).

L/D .—The maximum L/D is reduced 1 or 2 per cent.,



few thin sections. Section No. 50 gives the higher maximum lift and the greater room for spars, but No. 53 gives the higher efficiency.

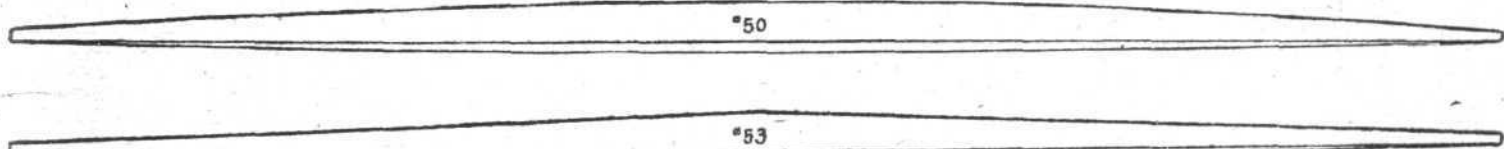


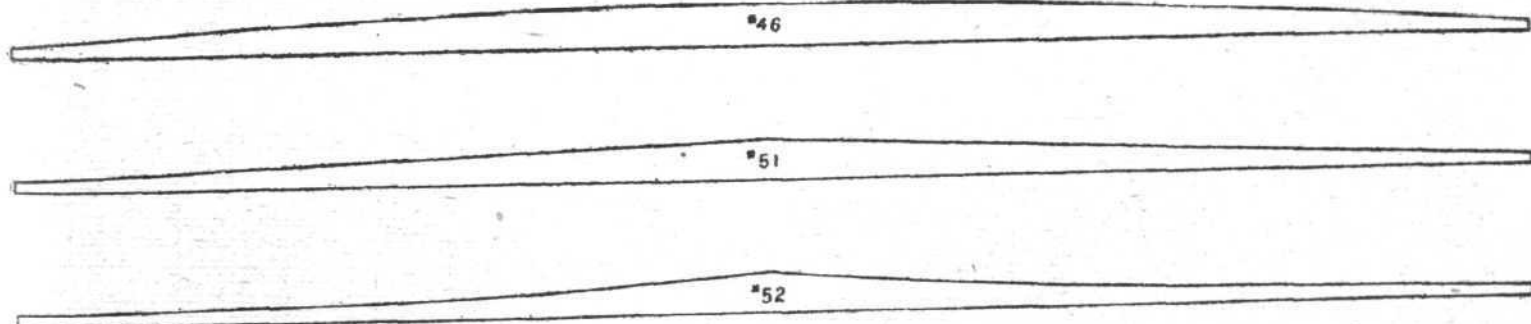
FIGURE 16

but the L/D at one-quarter maximum L_c is increased 10 per cent., and that at one-ninth maximum L_c 35 per cent. (Plots 13 and 14).

Centre of pressure travel.—The centre of pressure travel for No. 50 is plotted in Plot 15, and shows no difference from the travel on thin sections.

The Effect of Varying the Mean Thickness in a Series of Wings with Constant Tip and Centre Sections

The object of this series was the determination of the effects due to thinning the wing more or less rapidly from the centre to the tips. Front profiles of these sections (Nos. 46, 51, 52) are shown on Fig. 17.



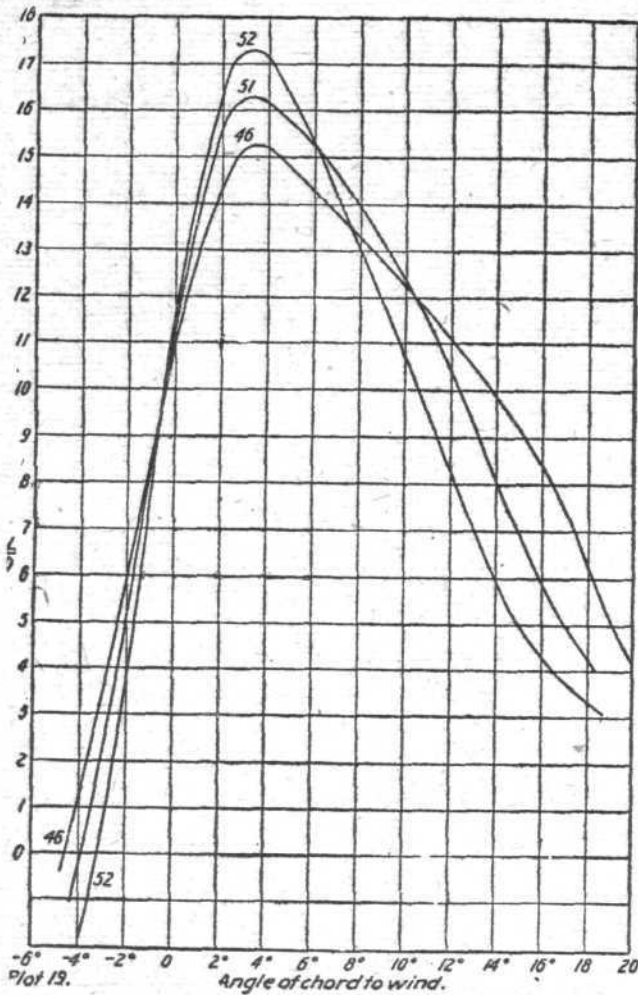
MAXIMUM SECTION NORMAL TO CHORD
Full Size Chord = 3"

FIGURE 17

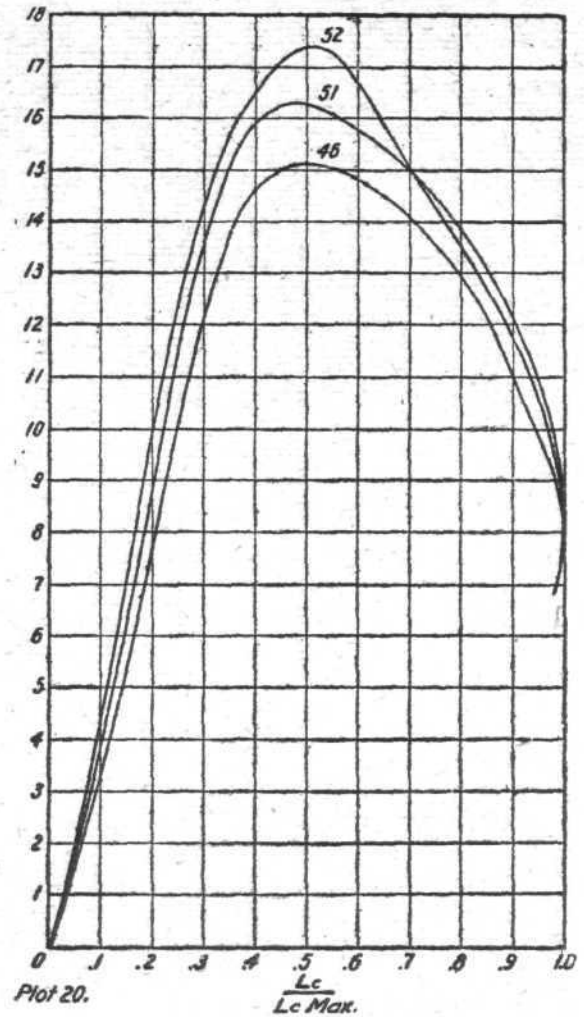
Both of these sections are excellent from every point of view. They allow room for ample spars (10-in. depth on a 5-ft. chord), have a high maximum L_c , a maximum L/D only slightly lower than the average for thin wings, yet have an L/D at low values of L_c that is only exceeded by a

The following facts are evident from this test:—

Lift.—The lift is everywhere decreased as the section is thinned, and all the sections show a flat burble point. The lift does not decrease as rapidly as the thickness, for the lift is approaching the limiting value of a flat plate. (Plot 18.)

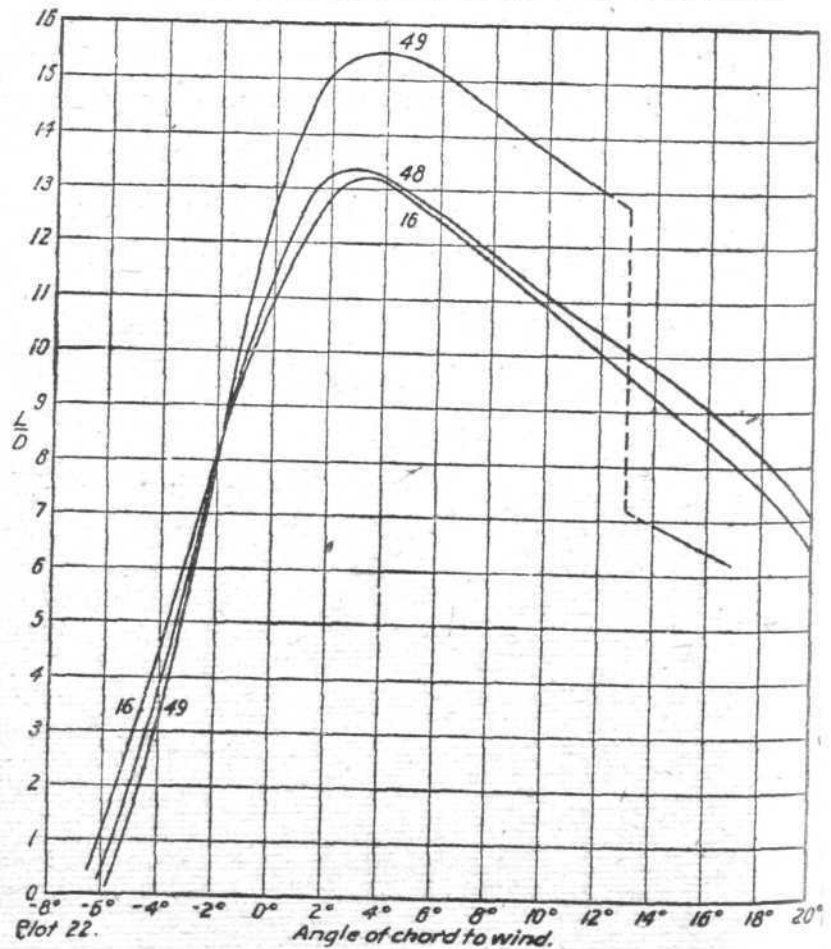
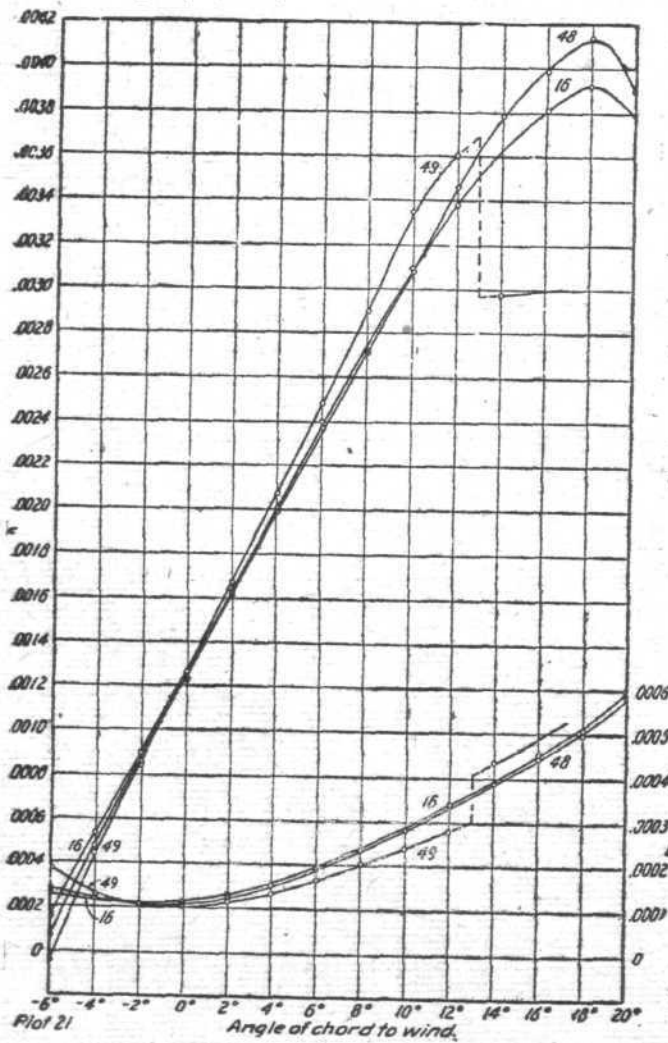


Plot 19.
Angle of chord to wind.
Drag.—The drag at low angles decreases with the thickness, but less rapidly as the wing becomes thinner. It is interesting to notice that above 12° the thicker wing has the least drag. (Plot 18.)



Plot 20.
 $\frac{L_c}{L_c \text{ Max.}}$
L/D.—The maximum L/D increases as the wing is thinned, reaching 17.4 for No. 52. At low angles the efficiency is increased in the same way. At high angles, however, the thicker wings are the more efficient. (Plots 19 and 20.)

Conclusions.—The results obtained from this series show that these wings have properties in general in close agreement with those of a uniform mean section. The more strongly



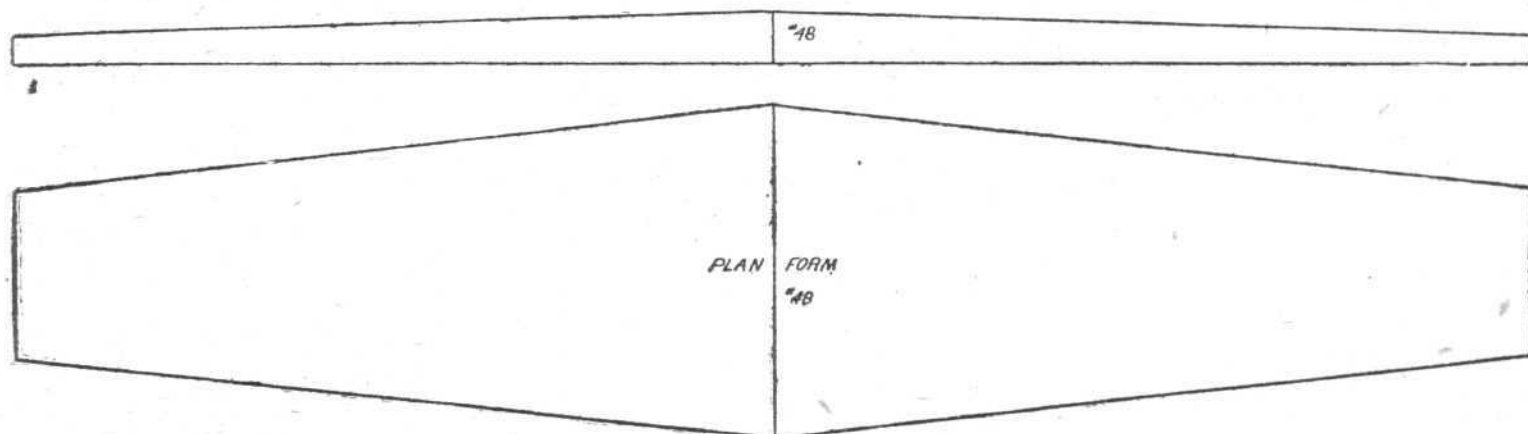
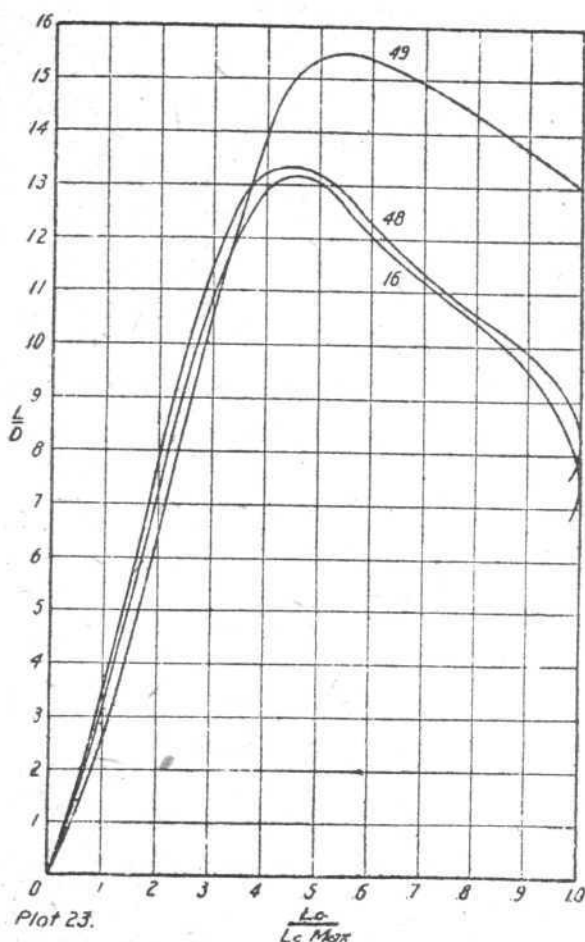


FIGURE 24

tapered ones show, however, an evidently greater efficiency at low angles than the mean uniform section would indicate.

Wings with Varying Chord

The wind tunnel investigations of wings that have a chord which varies along the span is a rather difficult problem, because of the great alteration in the properties of similar

Zeppelins for France

Two Zeppelins which have been allocated to France under the Versailles Treaty are to be delivered shortly. One is the L 72 and the other is an LZ of recent construction. The first will be handed over to the Navy and taken to Cuers-Pierrefeu, the naval air station in the Var. The other will be transferred to the Department of Aerial Transport and placed in the hangar at Maubeuge, which the Germans enlarged during the War. The airships will be taken to France by German crews under the control of a special mission, which will leave Paris when notice is received from the Inter-Allied Aeronautical Mission.

A Swiss-German Convention

It is reported from Berne that the Swiss Political Department is busily engaged in negotiations in connection with the drawing up of an aerial convention between Switzerland and Germany on similar lines to those recently concluded between Switzerland and France and Great Britain.

aerofoils, when the chord is changed. It seems evident, at least with thick sections, that the chord cannot be reduced to less than 2 ins. at 30 m.p.h. without introducing a break in the air flow that materially reduces the value of the maximum lift. For instance, a wing with a 2-in. chord at the tip and a 3-in. mean chord, gives a uniformly better performance than a similar constant section wing, but if the tip is reduced to 1½ ins., with the same mean chord, the performance is markedly inferior to the constant section wing. Again, section No. 49 (Plots 21, 22, 23), having a 24-in. span and a 1½-in. chord at the tip, gave a maximum L_c 0.00360, but when 3 ins. were cut off of each tip, leaving an 18-in. span and a 2-in. chord at the tip (Fig. 24), the maximum L_c was increased to 0.00413. This does not prove, however, that on a full-sized machine, where the LV is large, a small chord at the tip is a disadvantage.

For this same reason it seems probable that wind-tunnel tests on wings with raked and rounded tips, although showing a considerable advantage over a square tip, do not show as comparatively great an improvement as actually occurs on the full-sized machine. In order to investigate this matter fully, a series of similar sections should be tested with the greatest possible range in LV .

This subject of varying the chord was taken up not so much with the hope of improving the aerodynamic properties of the wing, but because of the structural advantages possessed by this type of wing. When the chord is diminished at the tip and increased at the centre, not only is the spar depth increased at the centre, but the centre of lift of the wing is brought closer to the body, thus decreasing the bending moment in the spars. If the wing is tapered sufficiently, the spars can be brought together at the tips as in the German Ago, simplifying and increasing the rigidity of the drag truss.

In comparing sections 16 and 48 (Plots 21, 22, 23) it is seen that the section with a varying chord has 5 per cent. higher maximum lift and substantially the same L/D at all points

When the L/D is plotted against $\frac{L_c}{L_{c \text{ Max}}}$ it is evident that

the constant section wing is inferior in efficiency at every point. There was time for only a very limited study of this subject, but the results show enough promise to deserve further investigation.

(To be concluded.)

Turin Exhibition Postponed

THE International Aviation Exhibition which was to have been held at Turin at the end of this month and the beginning of May has been postponed to October next.

Swiss Encouraging Aviation

THE Swiss Government has set aside a sum of two million francs for the improvement of aviation while three million francs is to be spent on the purchase of new machines.

An Aerial Post in Germany

It is stated that an aerial post will shortly be opened at Innsbruck in Germany, and that it will serve as the starting point of several aerial services in that country.

Commercial Aviation in Denmark

A COMPANY, under the style of Dankluftfartsselskab, has been formed in Denmark, and has demanded from the Government concessions to enable them to establish various aerial services. Their equipment includes 14 machines.

THE ROYAL AIR FORCE

London Gazette, April 20

Permanent Commissions

Sqdn. Ldr. S. G. Hodges, M.F., A.F.C. (A.), resigns his permanent commn.; March 16.

Short Service Commissions

The following officers have been granted short service commns. in the ranks stated. Except where otherwise stated, the commns. will have effect from April 20, and the officers will retain their seniority in the substantive rank last held by them prior to the grant of the short service commns.

In the case of officers now gazetted Flying Officer or Obs. Officer, from Pilot Officer, seniority will date from the date of Gazette:—

Flight Lieutenants.—D. McLaren (Med.); April 1. S. P. Simpson (A.); April 22. P. J. Wiseman (Ad.); April 1.

Flying Officers.—B. H. Cook (A.), H. J. T. Russell (A.), B. P. Springett (A.); April 16. R. V. Weeks (T.), T. J. West, M.C. (A.); April 19.

Observer Officers.—L. W. Aiken; March 31. F. A. Whippey, D.F.C.

Flying Officer (from Pilot Officer).—H. J. Armitage (A.), with effect from April 13.

The notifications in *Gazette* of dates indicated, appointing following officers to short service commn., are cancelled:—

Flying Officers.—A. H. Baker (T.), W. Dickison, D.S.M. (T.), R. J. E. Haynes (T.), J. W. Hutchins (T.); Sept. 12, 1919.

Flying Officers.—A. E. Case (T.), J. H. Slater, M.B.E. (T.), F. J. Tadman (T.), G. Lacey (T.); Oct. 24, 1919. Obs. Officer H. A. Cooper, M.C.; Dec. 12, 1919.

Flying Officer C. V. A. Bucknall (A.) (Lieut., 6th Dragoons), is appointed to a temp. commn. on re-seconding to R.A.F. for two years, with effect from Jan. 23.

The following Army officers are re-seconded to R.A.F., with effect from April 1:—Wing Comdr. R. D. S. Stoney, C.B.E. (Ad.) (Lieut.-Col., Army Pay Dept.); Sqdn. Ldr. H. C. Ellis, C.B.E. (Ad.) (Maj., Army Pay Dept.); Flying Officer W. H. Holroyd (Ad.), (Capt., Army Pay Dept.).

Flying Branch

Sec. Lieut. H. A. Scrivener to be Lieut.; April 7, 1919 (since demobilised). Pilot Officer N. P. B. Giddens to be Flying Officer; March 1 (since demobilised). Flying Officer (Hon. Flight-Lieut.) E. G. Baxter (Capt., I.A.R.O.) relinquishes his temp. R.A.F. commn. on reversion to I.A.R.O.; April 9.

(Then follow the names of 44 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health caused by wounds, and are permitted to retain their rank:—A. C. Nye; April 12. A. Metcalf; April 18. The notification in the *Gazette* March 28, 1919, concerning Sec. Lieut. E. Cotton is cancelled.

Administrative Branch

Sqdn. Ldr. E. R. L. Corballis, D.S.O., to be Sqdn. Ldr., from (S.O.); April 12. Flying Officer P. J. Murphy to be Flying Officer, from (S.O.); April 13.

Sec. Lieuts. to be Lieuts.—R. J. Searle (since demobilised) C. W. Slarke (since demobilised); April 11, 1919.

Pilot Officer D. S. G. Burton to be Flying Officer; March 26. Pilot Officer W. A. Gasper to be Pilot Officer, from (S.O.); Nov. 1, 1919. Sec. Lieut. C. W. Slarke (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec.

Lieut.; April 10, 1919. Flight-Lieut. H. Tilley, M.B.E. (Lieut., Temp. Capt., Durh. L.I.) relinquishes his temp. R.A.F. commn. on return to Army duty; April 12.

(Then follow the names of 24 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. C. W. N. Fuller relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; April 10 (substituted for notification in *Gazette* April 6). Temp. Sec. Lieut. W. J. H. Morgan resigns his temp. R.A.F. commn.; July 10, 1918. The rank of Sec. Lieut. (actg. Capt.) G. V. Jennings is as now described, and not as stated in *Gazette* March 25, 1919.

The notifications in *Gazette* of July 9, 1918, concerning Lieut. W. J. H. Morgan, *Gazette* Nov. 25, 1919; Sec. Lieut. P. B. Perry are cancelled.

Technical Branch

Flight-Lieut. T. G. Gordon, M.B.E., to be Flight-Lieut., from (S.O.); April 19. Flying Officer J. S. Goggin to be Flying Officer, from (S.O.); April 1. Sec. Lieut. G. M. Edmonston to be Lieut., Grade (A.); Oct. 5, 1918 (substituted for notification in *Gazette* Jan. 3, 1919). Sec. Lieut. P. C. Jones to be Lieut., Grade (A.); March 10, 1919, without pay and allowances of that rank prior to March 31, 1919 (since demobilised).

(Then follow the names of 21 officers who are transfd. to the Unemployed List under various dates.)

Medical Branch

H. B. Porteous (Capt., R.A.M.C., T.F.) is granted a temp. commn. as Capt.; Oct. 1, 1918, and to be actg. Maj. while specially employed; Oct. 21, 1918 (substituted for notification in *Gazette* Dec. 3, 1918).

(Eight officers transfd. to the Unemployed List.)

Dental Branch

(One officer transfd. to the Unemployed List.)

Lieut. T. H. Jones relinquishes his commn. on account of ill-health, and is permitted to retain his rank; April 13.

Memoranda

(Then follow the names of three Prob. Flight Officers granted temp. commns. as Sec. Lieuts., three Overseas Cadets granted temp. commns. as Sec. Lieuts., and nine Prob. Flight Officers granted hon. commns. as Sec. Lieuts.)

Wing-Comdr. J. D. Keir (Surg. Lieut.-Comdr., R.N.) relinquishes his temp. R.A.F. commn. on return to Naval duty; March 31. Group Capt. J. M. Home, C.B.E. (Lieut.-Col.) (Bt.-Col., Indian Army) relinquishes his temp. R.A.F. commn. on return to Indian Army; April 1. Flight-Lieut. H. R. Kavanagh, M.B.E. (Capt., R. Ir. Fus.), relinquishes his temp. R.A.F. commn. on return to Army duty; April 12.

(One officer transfd. to the Unemployed List.)

London Gazette, April 23

Flying Branch

Pilot Officer C. G. Pegg (Lieut., Midd'x R. (T.F.)) relinquishes his temp. R.A.F. commn. on return to Army duty; Sept. 19, 1919.

(Then follow the names of 15 officers who are transfd. to the Unemployed List under various dates.)

Pilot Officer S. C. Taylor relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; April 15

AVIATION IN PARLIAMENT

German War Planes.

COL. LOWTHER, on April 22, asked the Prime Minister, in view of the statement made on Thursday last by the Secretary of State for War to the effect that over 12,000 war planes were still in the possession of the Germans whether any date has been specified for their surrender; and, if so, what date and how many?

The Secretary of State for War (Mr. Churchill): My right hon. friend has asked me to answer this question. The points raised are already answered, so far as I am in a position to answer them, by the statement which I made on the 15th instant in reply to the Noble Lord the Member for Battersea (South) and in my supplementary answers on that occasion. I am not in a position to add anything further.

Col. Lowther: Will my right hon. friend tell the House what excuse is put forward by the German Government for the non-delivery of over 12,000 war planes?

Mr. Billing: Is it a fact that there are still 12,000 war planes in Germany?

Mr. Churchill: Yes, sir; but the aerial material is being handed over, and the question of its destination is in the hands of the Allied Council.

Col. Lowther: Is not all this paraphernalia of war, and is there anything so easy to hand over as war planes?

Mr. Churchill: They are being handed over and their destruction is now being taken in hand.

Sir H. Brittain: Why do you want to destroy them?

Halton Camp East Training School.

MR. TREVELYAN THOMSON asked the Prime Minister whether there are over 1,000 youths at the Royal Air Force school of technical training at Halton Camp East who are not now receiving any regular technical training or are employed on any Royal Air Force work; and whether it would be in the interests of national economy, as well as in the interest of the youths themselves, if those who desired release and had civil employment waiting for them could be discharged herewith?

Mr. Churchill: My right hon. friend has asked me to reply to this question which should in the ordinary course have been addressed to me. The total strength of boys at this camp is 2,610, of whom 2,148 are in the workshops; 244 are not receiving workshop training, but are, by their own choice, being given instruction in the duties of aircraft hands, whilst the balance of 218 are employed on duties outside workshops; are in hospital or in isolation; awaiting discharge on medical or compassionate grounds; or awaiting posting. All boys receive drill, disciplinary and educational instruction.

I am not prepared to accept the suggestion contained in the second part of the question. Discharge cannot be allowed, except on sufficient grounds otherwise opportunity would be given for boys to obtain a good and expensive education provided by the Government without any return accruing to the State.

Aeroplanes Lost in Irish Channel.

CAPT. WEDGWOOD BENN, on April 23, asked the Secretary of State for War and Air if he will state what was the petrol supply in each of the three

aeroplanes recently lost in the Irish Channel; what petrol supply was required to carry them their full journey; and whether any allowance was made for drift or delays or accidents?

Mr. Churchill: The petrol capacity of the type of aeroplanes used is 45 gallons, sufficient for at least 2½ hours' flight. All three machines were filled before starting. Under the conditions prevailing, 25 gallons should have been ample for the journey from Shotwick to Baldonnel, and it is estimated that there was at least one hour in hand for drift or unforeseen delays. The pilots had orders to turn back if Holyhead, half-way to Baldonnel, had not been reached one hour after starting. One of the three machines is known to have been in the air for over 2½ hours.

German Aircraft Material

[LIEUT.-COL. SIR F. HALL, on April 26, asked the Prime Minister if the French Government is satisfied, as the result of the investigations of the Allied Aeronautical Commission, that the provisions of the Peace Treaty with regard to the surrender or destruction of aircraft material have been substantially complied with?

Mr. Bonar Law: I have no information as to the views of the French Government on this matter, which is now under consideration by the Supreme Council.

Sir F. Hall: Have not they expressed any opinion with regard to it?

Mr. Bonar Law: They have expressed no opinion on this matter, so far as I know, but I believe it is being discussed at the Conference.

Col. Lowther: Will the right hon. gentleman give us an assurance that this material shall not be destroyed, but handed over intact either to the British or to the Allied Governments?

Mr. Bonar Law: I believe it is the intention of the British Government to have the Treaty carried out.

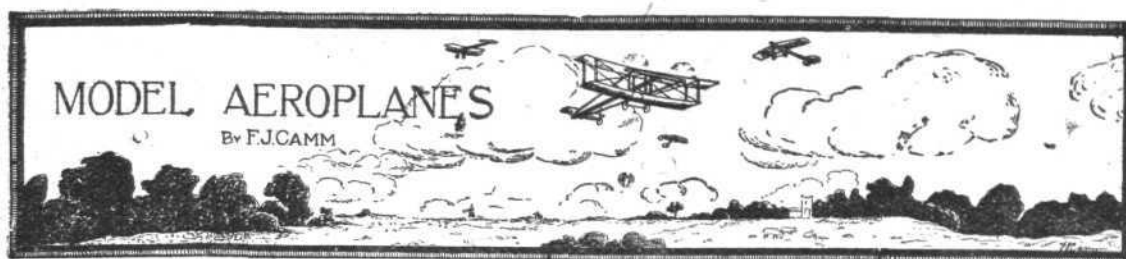
Sir F. Hall: Is not the right hon. gentleman aware that a lot of these camouflaged aeroplanes are at present in Holland, and does he understand how they got there?

Mr. Billing: Will the answer of the right hon. gentleman, that it is the Government's intention to have the Treaty carried out, be given full publicity in the country?

Mr. Bonar Law: There is no need of that. There has never been any doubt about it.

Col. Lowther: Will violations of the Treaty with Germany be condoned as they have been during the last year? Will the right hon. gentleman assure the House that the Germans will fulfil their obligations with regard to giving coal to France, surrender of their ships, and so on?

Mr. Bonar Law: That kind of question cannot be dealt with by question and answer. The whole subject of the extent to which it is possible in a given time to carry out the obligations of the Treaty must be considered otherwise than by question and answer.



NOTE.—All communications should be addressed to the Model Editor.

WE will consider this week the various applications of elastic rubber for the propulsion of model aeroplanes. As regards the motor itself, there can be no doubt that it is the simplest and at the same time for power developed the lightest obtainable. There are, however, three great objections to it. In the first place it is extremely perishable, especially the purest kinds. This is noticeable by the rubber becoming dry on the outside, and cracking. Secondly, the power commences to drop gradually from the moment the motor is started; and consequently there arises the third point, viz., the extremely limited time over which the power is spread.

The simplest way in which rubber can be applied to drive an aeroplane is in skeins of cord after the manner shown in the models with which I commenced this series—viz., by a hook at the front of the machine and another on the end of the wire propeller spindle. There is only one objection to this—namely, the rather large amount of friction at the bearing when the rubber is fully wound, caused by the pull of the twisted rubber between the two points. The friction of course tends to retard the revolution of the propeller and reduce the initial thrust and speed. When this arrangement is employed the bearing should be kept well lubricated with thick machine oil.

Friction may be reduced by fitting a ball thrust bearing. Such a bearing may be considered only worth the fitting on fairly large machines, as they would be very fiddling to make for tiny flyers. As an alternative, I give a drawing (Fig. 1) of an arrangement suggested by Mr. A. J. Hando—

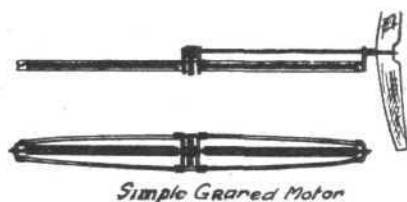


Fig. 1.

in a letter to FLIGHT some time ago. It will be seen that two skeins are used, both connected to a double-hooked spindle placed at the centre of the frame. Both rubbers should be of exactly the same length and strength, and if this

is carefully attended to friction from the effects of rubber pull is quite eliminated, the tension on one skein being balanced by the pull of the other.

It is true that the skeins are of only half the length of an ordinary skein fitted in the same frame, and consequently the two rubbers together will be fully wound when only half the number of turns have been given. Consequently, if the two cogged wheels at the centre connecting the rubber to the propeller shaft were the same size, the propeller would only make half the number of revolutions possible with a single skein. The remedy is obvious; a reduction of one to two must be given, that is to say, the pinion in the rubber spindle must have twice the number of teeth given to the pinion on the screw shaft. This leads us to another possibility, that of further utilising the principle of gearing by making a further reduction, say four to one, at the same time adding more strands to each of the skeins of rubber. The propeller shaft may have six or eight teeth, and the rubber spindle 24 or 32 teeth; by this means either very long flights with large diameter long pitch screws may be obtained, or a high thrust with small screws.

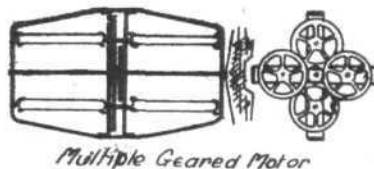


Fig. 2.

In Fig. 2, I show a compact geared rubber motor made possible by Mr. Hando's ingenious suggestion. In this motor eight short powerful skeins of rubber are employed, gearing down to the propeller on a ratio of, say, 6 to 1. The framework should be made from sheet aluminium of stout gauge, of sufficient strength, and the pinion and gear-wheels of brass, the latter lightened as far as possible by cutting away to form spokes. Such a motor would possess the advantage of being self-contained like a piece of clockwork, and could, of course, be so placed on the model as to adjust the centres of pressure and gravity.

GENERAL SYKES AT THE SUPERMARINE WORKS

WITH a view to keeping in touch with the latest developments of flying boats for civil aviation and firms building and using them, General Sykes, Controller-General of Civil Aviation, and Colonel Beatty paid an official visit to the Supermarine Works at Southampton on April 17.

They were met at Southampton Station, and were conveyed to the works, where, after a brief inspection, General Sykes requested to be taken out in one of the Supermarine commercial four-seater flying boats to make a survey of the Southampton Water, the Isle of Wight, Spithead and the Solent. This was carried out by the firm's head pilot, Captain Hoare, who landed the General on the River Itchen amongst the ordinary shipping that frequents Southampton at full water. This was followed by a series of demonstrations of how easily the Supermarine flying boat was manoeuvred, amongst ocean-going and river-going traffic in confined waters. Amongst other demonstrations, the flying boat, with the General on board, was stalled and let fall back into the water from a height of about 15 ft., and was taxied over stretches of water at a speed varying from 40-60 knots, doing turns and being navigated, showing her handiness on the water at these speeds amongst the river traffic, also demonstrating the lengths of a run required for pull-up, the short-

ness of which is very necessary, and is a particular feature of their boats.

Practically the whole of the actual demonstrations were carried out on the Itchen River, a branch of water running off the Southampton Water, which is crossed by floating bridges and has a continual up and down stream run of traffic.

The machine which the General went up in was one of the standard flying boats, fitted with 160 h.p. Beardmore engine, which, with 3½ hours' fuel and petrol, sea anchor, ground anchor and line, bilge pump, boat hook, semaphore flags, megaphone, engine spares, tools, etc., carries a useful load of 480 lbs. It was fitted with dual control, a speciality of these machines, they being convertible in one hour from a commercial machine carrying three passengers to a dual-control school machine. This machine has been in daily use for a period of six weeks, in training pilots of the Royal Norwegian Naval Air Service.

After lunch on board the managing director's yacht, an inspection of the works was made, the General being shown two new types of machines which are under construction, which form part of the firm's new policy and which will probably be shown at the forthcoming Aero Show.

SIDEWINDS

MESSRS. JAMES CLEWS AND SONS, LTD., announce that their offices and works have been moved to Waterloo Metal Works, Lewisham Road, Smethwick, near Birmingham, and all correspondence should now be sent to the new address. Their telegraphic address will remain as at present: "Rely, Birmingham," but their telephone number is now Smethwick 201.

OPALS, valued at £700, and a jade necklace worth £2,300, were recently carried to Paris in a Handley Page Commercial aeroplane. This method of conveying jewels to the Continent is gaining favour owing to the fact that the possibility of theft is extremely small. A London firm is sending consignments of valuable stones to Paris by air to be cut and polished.

A "CHOW" dog was recently flown to Paris in a Handley Page Commercial aeroplane. There are increasing enquiries for the transfer of animals by air to the Continent, as air travel obviates the confinement in baskets for many hours which rail and steamship travel involves.

WHILST a Handley Page Commercial aeroplane, demonstrating in India, was dropping leaflets over Calcutta, an amusing episode occurred. A flock of crows and kites, apparently resentful of the strange monsters that were daily appearing in their midst, especially when they saw a spray of white leaflets falling from one of the machines, held a hurried conference. Resolutions were apparently passed, and the enraged birds darted about behind the huge tail of the machine, seemingly unperturbed by the violence of the propeller draught. They snapped their beaks on the bits of paper and bore them in triumph to their nests, for examination.

News comes by cable that an average speed of 109.89 m.p.h. was maintained by Lieut. Holthouse and Lieut. Debeer in the 1,000 miles flight between Cape Town and Pretoria, which was recently accomplished in 9 hours 6 mins. This speaks well for the efficiency of the Siddeley-Puma engine and British magnetos, which form the propelling unit of the South African Government aeroplane "Vortreker," which was used for the flight.

By one of those little slips which are simply unaccountable, the address of the Gas Accumulator Co. (U.K.), Ltd., who specialise in aerial lighthouses, was wrongly given as Brentwood in our last issue. It should, of course, have been Brentford, as was apparent from the telegraphic address.

THE successful testing of the new Handley Page aeroplane wing at the National Physical Laboratory, and the confirmation of the claims made by the Company, will, it is anticipated, result in an important reduction in the size of aircraft and a resultant decrease in the cost of running expenses. Machines will be able to land at speeds considerably less than at present, smaller aerodromes will be required and landings will be possible in small fields in case of necessity. Incidentally, the invention should eventually result in a considerable decrease in freight and passenger rates, apart from the fact that it should render it possible, in the near future, to produce small aeroplanes at a price comparable with that of a two-seater car.

In the Prize Court

IN the Prize Court on April 21, before the President, Sir Henry Duke, a claim was made in respect of Seaplane 8,676. The facts were given in the affidavit of Maj. Basil Deacon Hobbs, R.A.F., who said that on September 28, 1917, he was off the south-west corner of Thornton Ridge, operating under the directions of the Admiralty, when he saw an enemy submarine on the surface. He immediately engaged the enemy, which proved to be the U.C. 6, and he destroyed it by dropping bombs. There were no survivors of the crew of 18.

Mr. Victor Russell appeared for the Crown, and did not oppose the claims.

The President awarded Seaplane 8,676 £90.

PUBLICATIONS RECEIVED

Preparation Meteorologique des Voyages Aeriens. By J. Rouch. Paris: Masson et Cie., 120, Boulevard Saint-Germain. Price 6 francs net.

Report No. 71. Slip-Stream Corrections in Performance Computation. The National Advisory Committee for Aeronautics, Navy Building, 17th and B. Streets N.W., Washington, D.C., U.S.A.

COMPANY MATTERS

Rolls-Royce, Ltd.

THE directors' report for the year ended October 31 last states, it will be remembered, that a dividend, for the said period, of 15 per cent. (less income tax) was, on the directors' recommendation, declared at the general meeting on February 20 last, and that the meeting was adjourned to receive the balance sheet when ready. After (a) paying or providing for all trading expenses and suitable depreciation of buildings, machinery and plant, and writing down of new buildings, machinery and plant erected and installed for war purposes; (b) charging repairs and replacements to revenue, and (c) making provision for estimated excess profits tax, the trading for the year has been ascertained to have resulted in a net profit of £192,777 13s. 7d., as compared with £153,261 13s. 3d. for the previous year. The balance sheet takes no account of the manufacture for war purposes in the United States of America, contracts for which were financed by the British Government. The directors recommend that the balance of profits, after paying the dividend above mentioned, should be utilised as set out in the appropriation account. The policy is adhered to of manufacturing only one size of motor chassis, which, with several patterns of aero engines, in substance, comprise the Company's entire output. The demand for the Company's chassis is phenomenal. With a view to securing supplies of essential materials, the Board propose to erect and equip, or acquire, buildings for their production, or to acquire interests in other manufacturing concerns.

NEW COMPANY REGISTERED

BORDER AVIATION CO., LTD., 21, Botchergate, Carlisle.—Capital £2,500, in £1 shares. Carriers of goods and passengers by aviation, dealers in aeroplanes, etc. First directors: P. H. Ingham, R. F. Little and R. J. Cairns.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published April 29, 1920

16,248. CLERGET, BLIN ET CIE. Sparking-plugs. (102,260.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published April 29, 1920

19,783. R. R. EVANS. Signalling or indicating to aeronauts names of places or latitude and longitude thereof. (140,852.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published April 29, 1920

1,445. J. W. RAPP. Running gear for aeroplanes. (122,646.)

1,477. H. G. HOWITT, W. J. PRICHARD and J. EVANS. I.C. rotary engines. (140,866.)

5,564. L. MUTTI and L. CAMBLANC. Revolving-cylinder engines. (140,888.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxviii, xxix and xxx).

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